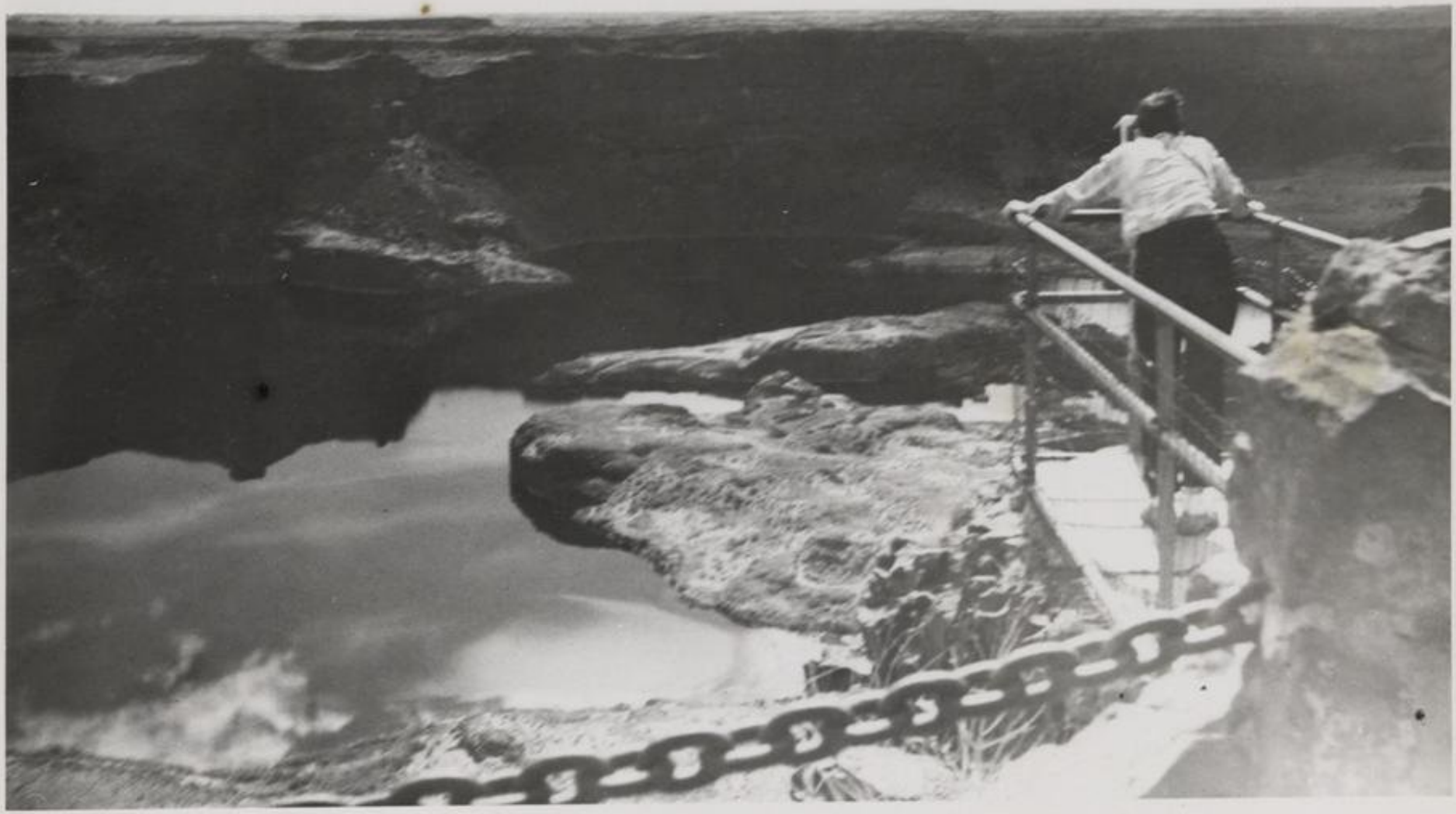
Course material from Geology 130 - Physiography of the US - 1. 1929-1945



GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 21, 1945

Write on 4 questions and no more; majors in geology or geography must include at least one of the first two questions Please mark which questions you wrote.

(1) Discuss with diagrams not less than three possible explainations of geologic structure which could give rise to hogbacks in which strata dip toward the mountains.

(2) Compare merits of THREE different hypotheses of origin of Scablands of Columbia Plateau

(3) Describe and account for origin of Grand Coulee, Columbia Plateau but omit Scabland contoversy.

(4) Complete following sentences (only single sentence of reasonable length considered) giving best proof of statement:
(a) The west face of Wasatch Mts. is so straight and abrupt because-
(b) The physiographic history of Uinta Mts. is simplified by modern interpretation of the upland surfaces because---
(c) The Snake River Plain is crossed by so few rivers from the mountains because-
(d) Glacier National Park is considered more scenic than Rocky Mt. National Park, Col., because---
(e) The Rocky Mt. Front of Colorado is an erosional feature developed during the Pleistocene period because--

(5) Where and what are from standpoint of origin (be specific in location):
(a) Edwards Plateau, (b) Mesa de Maya, (c) Absoraka Mts., (d) Sand Hills of Nebraska, (e) Snake River Canyon, (f) Garden of the Gods, Col., (g) Craters of the Moon, Idaho, (h) Poverty Flat, (i) Bitterroot Range, (j) Lake Missoula

(6) Discuss briefly definition, boundaries, geology and major topographic features of EITHER (a) Front Renge of Colorado or (b) Yellowstone Plateau or (c) Payette Section, Columbia Plateau

(7) Where (be specific) in provinces thus far studied this semester could you find a good example of:
(a) anticlinal mountain range, (b) mountain front without hogbacks, (c) plain due to confluent alluvial fans, (d) valley due to folding and since filled by sediments from mountains, (e) valley of antecedent stream, (f) butte capped by clay hardened by burning of lignite, (g) cirques, (h) laccolitic mountain, (i) cinder cone, (j) fault block mountain.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination Feb. 21, 1945

Graduates and majors in geology or geography must write on at least one of first two questions and any one of next four questions making four questions in all; non-majors may write on any questions but last one can be chosen by them only. Everyone is to write on a total of four questions; please mark which questions you wrote on.

(1) Compare peneplains and pediments as to (a) definition, (b) origin, including processes, (c) topography, (d) evidence of subsequent tilt, (e) overlying deposits which may be expected.

(2) Compare two hypotheses which could account for the observed alternation of stream deposition with stream erosion found throughout Great Plains.

(3) Where (give province and state as definitely as possible) and what (give physiographic significance) are: (a) Devils Tower, (b) Break of the Plains, (c) Black Hills, (d) St. Francis Mts., (e) Missouri Coteau, (f) Cypress Hills, (g) Pikes Peak, (h) tepee buttes, (i) Athens Plateau, (j) San Luis Valley

(4) Discuss briefly definition, geology, and topogfaphy of EITHER (a) Salem Plateau OR (b) Plains Border (one only)

(5) Complete following sentences giving best proof of each statement (no more than one sentence of reasonable length considered);
(a) Present topography of Colorado Piedmont was formed during the Pleistocene (Quaternary) period because---
(b) The High Plains once sloped away from crest of Rocky Mts Front because---
(c) The original Ouachita Mts. formed by folding were destroyed before Cretaceous time because----
(d) Meandering valleys of Ozark Plateau demonstrate------- because--
(e) Grass-covered sand dunes of Nebraska prove that------

(6) Discuss BADLANDS in respect to cause and location in Great Plains

Following question can be written by non-majors only

(7) Where in provinces thus far studied could you find one good example each (a) karst topography, (b) loess plain, (c) lava-capped mesa, (d) volcanic crater, (e)mountains eroded from thick volcanic flows, (f) h ogbacks, (g) mountain front without hogbacks, (h) cirque, (i) monadnock, (j) cuesta

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Final examination May 19, 1944

Write on 10 questions only.

(1) Complete following sentences giving proof of each statement:
   (a) The plateau-like topography of Northern Rockies may be explained by...
   (b) The Rocky Mountain front of Colorado is erosional and not due to earth movement because....
   (c) The Snake River Plain is so flat because.....
   (d) The Tertiary Basins of Northern Rockies are constructional and not erosional before deposition of Tertiary in them because...
   (e) Glacier National Park is more scenic than Rocky Mt. Nat. Park because...

(2) Account for (be brief) and locate by province and state: (a) Devils Tower (b) Athens Plateau (c) Salem Platform (d) Marysville Buttes (e) Pine Ridge (f) Race Track (g) San Francisco Mt. (h) Dominguiz Hill (i) Mt. Shasta (j) Boston Mts.

(3) Explain topography and origin of Badlands including an outstanding example

(4) Account for and name examples of three kinds of mountains within Colorado Plat.

(5) Discuss the Basin-Range Problem

(6) Discuss relative importance of wind and water erosion in more arid parts of western United States

(7) Account for, describe, and locate at least three laccolithic mountains of varying age.

(8) Discuss the history of topography of Sierras including Yosemite Valley

(9) Discuss steps in history of Ouachita Mts.

(10) Compare merits of two hypotheses of origin of CraterLake, Oregon

(11) Demonstrate that the Grand Canyon of the Colorado is erosional and not due to faulting or local folding

(12) Summarize the outstanding topographic features of Angeles Section and discuss its history.

(13) Compare merits of two of the major hypotheses of origin of scablands.

Please indicate what questions you left out

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 21, 1944

Write on four questions

(1) Compare merits of two theories of origin of ~~XXXXXX~~ Crater Mound, Ariz.

(2) What evidences tell of climatic changes in Basin and Range Province during Pleistocene time? during Recent time?

(3) Explain in proper order the evidences which prove the major steps in Physiographic history of Colorado Plateau from Cretaceous to present.

(4) Compare relative merits of at least two hypotheses of origin of enclosed basins of Basin and Range Province.

(5) Complete following sentences (no more counted) giving best proof of each statement:
(a) The mountains of the Sonoran Desert are older than those of the Great Basin because----
(b) Talus is scanty along many of the cliffs of the High Plateaus of Utah because---
(c) The volcanic mountains of Basin and Range and Colorado Plateau are of different ages because---
(d) A type of geologic structure which is prominent in topography of both Colorado Plateau and Basin and Range is------- because---
(e) The Mexican Plateau is separated from the Sacramento Section because---

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 23, 1944

Write on four questions

(1) List in parallel columns arguments for and against the existance of a dissected peneplain in Rockies of Idaho

(2) Complete following sentences giving best proof of each statement:
(a) The east face of the Tetons is straight because----
(b) Scablands were eroded by glacial meltwaters because----
(c) Snake River Plain is so level because---- -----
(d) Yellowstone National Park is included in the mountain province because---
(e) Many of the rivers of the Wyoming Basin leave the plains and cross mountain ridges through narrow canyons because---

(3) Discuss and compare merits of three different hypotheses of cause of Green River crossing Uinta Mountains

(4) Describe Grand Coulee and discuss its origin omitting Scabland Controversy

(5) Discuss explanations of the courses of the Major rivers of Columbia Plateau including the Yakima District

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination Feb. 24, 1944

Write on four questions and no more; note choice in No. 5

(1) Discuss and compare two theories to explain the alternate stream deposition and erosion in Great Plains during Tertiary and Quaternary periods

(2) Complete following sentences (no more counted) giving best proof of each statement:
(a) The High Plains once sloped down from the top of the Rocky Mountain front because---
(b) There is no Break of the Plains in Nebraska because-------
(c) The High Plains once extended farther east than they now do because---
(d) The upland of the Ozark Plateau may be a pre-Pennsylvanian Peneplain because------
(e) The San Juan Mts. are more picturesque than the Front Range because-----

(3) Compare two theories of origin of the several upland levels o f Southern Rockies

(4) Where and what are (give province, s tate, section and origin):
(a) St. Francois Mts. (b) Hot Springs Plateau (c) White River badlands, (d) Pikes Pea k , (e) Palo Pinto country, (f) Red Valley, (g) Pecos Valley, (h) Devils Tower, (i) Missouri Plateau, (j) Cypress Hills

(5) Discuss briefly (limit 2 pages) the geology, topography and history of ONE of the following:
Edwards Plateau
~~Ozark Plateaus~~
Ouachita Mts.
Raton District

GEOLOGY 130

Physiography of Western United States

Final examination May 26, 1942

Write on any 10 questions please marking which you left out.

1. Describe origin of five different kinds of plains found within Basin and Range province.

2. What relation is there between stream pattern and anticlinal structure in (a) Los Angeles region, and (b) The Solatario.

3. Discuss Hodge's ideas of origin of gorge of Columbia River in Cascades.

4. What physiographic evidences demonstrate faulting.

5. Contrast origin of the Coulees of Columbia Plateau with that of the scablands.

6. Account briefly for (a) Boston Mts., (b) Springfield Platform, (c) St. Francis Mts., (d) Goshen Hole, (e) Edwards Plateau. Use diagrams where needed.

7. Explain conditions for formation of badlands and locate at least two good examples.

8. Discuss the "Basin Range" problem.

9. Outline major steps of physiographic history of Sierras including Yosemite Valley using diagrams where needed.

10. Summarize, geology and topography of either (a) Sacramento Section or (b) Great Basin.

11. Explain effect of continental glaciation on topography of Missouri Plateau.

12. Compare two explanations of origin of Crater Lake, Oregon.

course not given after 1943

To file

PHYSIOGRAPHY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 1, 1942

Write on 4 questions only. Please mark which you left out.

1. In parallel columns list points for and against existence of a dissected peneplain in the Northern Rockies (not its age).

2. Complete the following sentences giving proof of each (no more wanted):
   (a) The west face of the Wasatch Mts. is straight because
   (b) The Rocky Mountain Front in Glacier National Park is more scenic than in Colorado because
   (c) Scablands were made by glacial meltwaters because
   (d) Snake River plain is so level because
   (e) Northern Rockies are unlike Southern Rockies because

3. Discuss origin of Tertiary Basins of northern Rockies.

4. Discuss physiographic history of Yakima district, Washington giving two interpretations.

5. Discuss effect on physiographic history of interpretation of uplands in Rocky Mts. as dissected pediments instead of dissected peneplains including reasons for such change in interpretation.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 27, 1942

Write on four questions only and please mark which you left out

(1) Discuss and compare two explantions of origin of the non-volcanic mountains of Basin and Range Province

(2) Complete following sentences stating best proof (no more counted):

(a) The mountains of the Sonoran Desert are older than those of the Great Basin because

(b) Horizontal stripping is relatively more impottant in Colorado Plateau than in eastern United States because

(c) Zuni Mountans resemble because

(d) Faults in Colorado Plateau are of different ages because

(e) The Kaibab Plateau may not have been completely covered by Eocene sediments bacause

(3) Discuss and compare merits of two hypotheses of origin of Crater Mound, Arizona

(4) What evidences tell of past climate (since early Tertiary) of Basin and Range Province?

(5) List in proper order and explain major steps in physiographic history of Colorado Plateau

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 4, 1942

Write on 4 questions only

1. Compare two hypotheses of origin of terraces of Missouri Plateau.

2. Complete following sentences (no more counted) giving proof of each statement:

   (a) Devils Tower is a volcanic neck because

   (b) The High Plains once extended farther east because

   (c) The St. Francois Mountains were once buried under Paleozoic sediments because

   (d) The Pecos Valley was eroded during Quaternary time because

   (e) The two story topography of the Ouachitas is interpreted as due to

   . . . . . because

3. Discuss briefly the boundaries, geology and topography of any <u>one</u> of the sections of Great Plains.

4. Compare two distinct explanations of history of San Juan Mountains.

5. Account for the distribution and origin of (a) Bad Lands, (b) sand dunes (both in the Great Plains)

6.(a) What effect has overturning of strata had on the topography of the Ouchitas?

(b) Why are hog backs present only along certain parts of the Rocky Mountain Front?

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Write on four questions and no more. Please show which you left out.

(1) Complete the following sentences giving briefly (limit a single sentence of reasonable length) best proof of each statement:
   (a) The Coastal Plain probably once buried the Ouachita Mountain because--
   (b) The Boston Mountains do not fit into the hypothesis of a fairly recent "Ozark peneplain" because--
   (c) The High Plains once extended farther north than now because---
   (d) The High Plains once extended farther east than now because---
   (e) The Edwards Plateau was uplifted above the Coastal Plain in fairly recent time because--

(2) Locate by province, state, section etc. (as specifically as possible) and give briefly origin of: (a) Gang Plank, (b) Pikes Peak, (c) Salem Plateau, (d) Missouri Coteau, (e) Callahan Divide, (f) St. Francis Mts., (g) Athens Plateau, (h) Comanche Plateau, (i) Hot Springs "peneplain", (j) Pine Ridge

(3) Describe in proper order not less than 5 major steps in combined history of Southern Rockies and central Great Plains.

(4) Account for formation of badlands and give two major localities in Great Plains.

(5) Give evidence for and discuss origin of "San Juan peneplain".

(6) Explain why Great Plains is separated from Central Lowland and discuss location of the dividing line.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Final examination June 16, 1941

Write on 10 questions only and please mark which you left out. Graduates and Majors must include at leat one of first two questions.

(1) Compare the evidences for and against the "Cascade Peneplain"
(2) Explain the significance to physiographic history of studies of the sediments of (a) Great Valley of California and (b) High Plains
(3) Account for (a) Devils Tower, (b) Pine Ridge, (c) Boston Mts. (d) Raton Mesas, (e) Red Valley
(4) Describe origin and topography of Yellowstone Plateau including Yellowstone Lake
(5) Account for three distinct types of mountains within the Colorado Plateau
(6) Discusss relative importance of wind and water erosion in Basin and Range Prov.
(7) Describe the kinds of evidence which demonstrate changes in climate during physiographic history of Basin and Range Province.
(8) Compare two theories of origin of Crater Lake, Oregon.
(9) Discuss two theories of origin of drainage of Colorado Plateau in respect to structure of bed rocks.
(10) Contrast volcanic topography of (a) Cascades with (b) Columbia Plateau
(11) Demonstrate the proofs that the Grand Canyon of the Colorado is due to removal of material by the river and not to depression of the ground.
(12) Describe the physiographic history of Sierras including Yo^semite Valley
(13) Account for (a) Absoraka Range, (b) Marysville Buttes, (c) San Francisco Plateau, (d) Golden Gate, (e) Moses Coulee

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination May 9, 1941

Write on four questions only and please mark on cover of book which you left cut. GRADUATES AND MAJORS must include one or both of first two questions.

(1) Discuss and compare two explanations of origin of enclosed depressions in Basin and Range province.

(2) Discuss recent studies of Colorado River in Basin and Range province.

(3) List and give origin of three different kinds of plains which occur in Basin and Range province.

(4) What physiographic evidences demonstrate presence of concealed faults in Basin and Range province?

(5) Complete following sentences :
(a) The Grand Canyon of the Colorado was eroded in a different cycle of erosion than the cliffs of the High Plateaus because----
(b) Talus is scanty in the Colorado Plateau because----
(c) Meteor Crater is the product of a relatively high-powered explosive because----
(d) Faulting has continued in Colorado Plateau throughout a long time because
(e) Aridity has been the prevailing condition in Basin and Range province for a long time because-----

(6) Where in Colorado Plateau or Basin and Range could you find a good example each (name locality as definitely as possible) of the following:
(a) recent fault scarp, (b) volcanic neck, (c) uneroded laccolith,
(d) anticlinal valley, (e) pediment, (f) fault block made of lavas,
(g) sink hole, (h) beach of extinct lake, (i) cinder cone, (j) playa

(7) Account for the steep slopes of most mountains in Basin and Range province.

Geology 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 7, 1941

Write on four questions only. Graduates and majors must include at least one of first two questions. Please mark on cover of your book which questions you left out.

1. Discuss and compare two theories of origin of SCABLANDS

2. Discuss the course of the Green River across the Uinta Mountains.

3. Where in provinces studied this semester could you find a good example of

(a) volcanic cone, (b) mesa capped by lava, (c) antecedant stream, (d) hogback due to thrust fault, (e) glacial lake bed, (f) gorge of superimposed stream, (g) pediment still covered by gravel, (h) anticlinal mountain range, (i) fault escarpment of plateau, (j) mountain front without hogbacks

4. Complete following sentences giving best proof of each --

(a) Yellowstone Park is included in the Rockies because

(b) The mountains of Idaho were deeply eroded before the Columbia River basalt eruption because

(c) Glaciation increased the scenic effect of Glacier National Park because

(d) The rivers of Wyoming Basin pay no attention to the mountains because

(e) The Columbia River makes its bend to northwest of Spokane because

5. Discuss topography and origin of Grand Coulee (omit scabland controversy).

6. Discuss briefly the geology, topography and history of either (a) Snake River Plain, or (b) Payette section of Columbia Plateau.

Geology 130

green out

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 7, 1941

Write on four questions only. Graduates and majors must include at least one of first two questions. Please mark on cover of your book which questions you left out.

1. Discuss and compare two theories of origin of SCABLANDS

2. Discuss the course of the Green River across the Uinta Mountains.

3. Where in provinces studied this semester could you find a good example of

   (a) volcanic cone, (b) mesa capped by lava, (c) antecedant stream, (d) hogback due to thrust fault, (e) glacial lake bed, (f) gorge of superimposed stream, (g) pediment still covered by gravel, (h) anticlinal mountain range, (i) fault escarpment of plateau, (j) mountain front without hogbacks

4. Complete following sentences giving best proof of each --

   (a) Yellowstone Park is included in the Rockies because

   (b) The mountains of Idaho were deeply eroded before the Columbia River basalt eruption because

   (c) Glaciation increased the scenic effect of Glacier National Park because

   (d) The rivers of Wyoming Basin pay no attention to the mountains because

   (e) The Columbia River makes its bend to northwest of Spokane because

5. Discuss topography and origin of Grand Coulee (omit scabland controversy).

6. Discuss briefly the geology, topography and history of either (a) Snake River Plain, or (b) Payette section of Columbia Plateau.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 10, 1941

Write on four questions only. Graduates and majors must include at least one of the first two questions. PLEASE mark on cover of your book which questions you left out.

(1) Expalin the differences in origin and form between (a) peneplain and (b) pediment

(2) Discuss with diagrams two possible explanations of the age relations of the upland surfaces in Southern Rockies

(3) Complete following sentences (no more counted) giving best proof of statement:
(a) The Ouachita Mountains were once buried under the Coastal Plain because...
(b) The Ozark Plateau may be a surface of pre -Pennsylvanian age because....
(c) The High Plains once extended farther north because.....
(d) The Colorado Piedmont was formed during Pleistocene time because..
(e) The Edwards Plateau has been uplifted in rather recent time because....

(4) In the region studied this semester locate a good example each of:
(a) laccolithic mountain (b) tepee butte (c) sand dunes (d) terminal moraine of continental glacier (e) loess plain (f) ridges on overturned resistant layer (g) cuesta (h) monadnock (i) cirque (j) hogback

(5) Describe and account for location of east boundary of Great Plains

(6) Explain physiographic history of Raton section of Great Plains

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Final Examination June 11, 1940

Write on 10 questions in all. Please mark on cover which you left out. Graduates and majors must include at least one of first two questions.

(1) Compare merits of the theories of Allison, Bretz, and Flint on origin of the Scablands.

(2) Discuss significance of the pre-Pennsylvanian surface of the Ozarks with respect to the present uplands and the Boston Mountains.

(3) Complete the following sentences (a) The Grand Canyon of the Colorado was formed in a different cycle of erosion than the escarpments of the High Plateaus of Utah because
(b) This mountain range is bounded by a fault because - (two reasons).
(c) The Colorado Plateau is differentiated from the Basin and Range Province because
(d) The Henry Mts. are known to be - because
(e) Because basalt of the same kind occurs both on the valley floor and the top of the mountain adjacent we must conclude that

(4) Discuss two distinct theories of the origin of Crater Mount or Coon Butte, Arizona.

(5) Discuss two distinct explanations of the origin of the enclosed basins of the Basin and Range province.

(6) Discuss evidences for and against peneplaination of the northern Cascades.

(7) Discuss two explanations of the course of Columbia River across the Cascades.

(8) What has been the effect of continental glaciation on the topography of the Great Plains? Explain fully including drainage changes.

(9) What topographic forms due directly or indirectly to vulcanism are found in the Great Plains? Locate examples of each.

(10) Account for the origin and present distribution of the High Plains.

(11) Outline with diagrams the history of the topography of the Southern Rockies as interpreted in text.

(12) Illustrate by diagrams:
(a) effect on topography of an overturned fold in which great differences in resistance of strata are present,
(b) why hogbacks are present only along certain parts of the Rocky Mountain Front. Give examples of both.

(13) Explain the conditions requisite for the formation of badlands and locate two important areas in Great Plains.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Makeup examination May 10, 1940

Write on four questions only and please mark which you left out.
Majors and graduates must include either or both (1) and (3).

(1) Discuss origin of the mountain ranges of the Basin and Range Province.

(2) Explain with diagrams drainage history of Colorado Plateau and discuss an older hypothesis.

(3) What evidences tell of the past climates of Basin and Range Province?

(4) Complete following sentences (no more counted):
(a) The Tonto Platform is due to weathering and erosion because...
(b) The Salton Sea basin is due to ...
(c) The Rio Grand River may have originated in Pleistocene time because...
(d) Talus is scanty in Colorado Plateau because...
(e) Henry Mts. are.....because...

(5) Where in Colorado Plateau or Basin and Range could you find good examples of (localities as definite as possible): (a) fault scarp, (b) volcanic neck, (c) uneroded laccolith, (d) anticlinal valley, (e) pediment, (f) fault block mountain capped with lava, (g) sink hole, (h) sand dunes, (i) cinder cone, (j) playa?

(6) Discuss theories of origin of Crater Mound, Arizona.

(7) Discuss origin of three different kinds of plains found in Basin and Range Province.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination May 3, 1940

Write on four questions only but graduates and majors must include one of first two questions Please mark on cover which you left out.

(1) Discuss origin of the enclosed basins of Basin and Range Province including interpretation of deposits in them.

(2) Explain with diagrams the major steps in physiographic history of Colorado Plateau

(3) What evidences show that many of the "Basin Ranges" are bounded by faults?

(4) Complete following sentences giving proofs of statement (no more counted):
(a) The benches within the Grand Canyon of the Colorado are due to weathering and erosion and not to uplifts because...
(b) The mountains of the Sonoran Desert are topographically older than those of the Great Basin because...
(c) The Colorado River first crossed the Basin and Range province in its present location in Pleistocene time because...
(d) Talus is scanty in Colorado Plateau because...
(e) Zuni Mountains are similar to ..... because...

(5) Describe and account for two types of escarpments in Colorado Plateau

(6) Discuss evidences of more and larger lakes in Basin and Range Province and account for them.

(7) Discuss origin and cite an example of laccolithic mountains in Colorado Plateau

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination April 1, 1940

No one is to write on more than four questions; graduates and majors must write on one of first two questions. Please mark on cover of bluebook which questions you did NOT write.

(1) Discuss points for and against the existence of a highly diss ected peneplain in Northern Rockies

(2) Give four possible structural relations of foothill hogbacks of Northern Rockies which show a dip toward the mountains.

(3) Complete following sentences giving proofs of each statement:
(a) The mountains of western Idaho were deeply eroded before the eruption of the Columbia Plateau lavas. .....Snake R.
(b) Interpretation of the sloping smooth uplandsof Uinta Mountains as pediments rather than peneplains simplifies the physiographic history because....
(c) The major rivers of Wyoming Basin cross mountain folds because...
(d) The Scablands are the product of glacial waters because.....
(e) Interior drainage is found in (g ve two localities with state and physiographic province thus far studied)..... because.....

(4) Give examples in Northern and Southern Rockies showing the effect of glaciation on scenic features.

(5) Discuss features and origin of Grand Coulee

(6) Explain two different hypotheses of drainage of northern Columbia Plateau (NOT the Scabland problem)

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 4, 1940

Write on four questions only, and please put marks on bluebook cover opposite numbers of those which you left out.

Please be brief as no overtime can be allowed.

Majors and graduates must write on at least one of the first two questions.

(1) Compare the basic ideas underlying two different hypotheses of the age relations of the several upland levels in Southern Rockies.

(2) Compare two different hypotheses of the cause of alternate erosion and sedimentation in the High Plains during the Tertiary period.

(3) Complete following sentences (no more counted):

(a) The High Plains once extended up to the top of the Rocky Mt. Front because

(b) There is no Break of the Plains in Nebraska because

(c) The High Plains once extended farther north because

(d) The Ozark dome was leveled before Pennsylvanian time because

(e) The Ouachita Mountains were peneplained before Cretaceous time because

(4) Describe briefly the physiographic history of San Juan Mountains.

(5) Where in provinces thus far considered could you find good examples of
(a) karst topography
(b) upland capped by chert
(c) sand dunes
(d) valley along outcrop of weak sedimentary rock
(e) mesa capped by lava
(f) cirque
(g) monadnocks
(h) alluvial fan
(i) badlands
(j) terminal moraine of continental glacier.

(6) Explain briefly what is meant by terms
(a) peneplain, and (b) pediment

(7) Discuss briefly the boundaries, geology and topography (limit two pages) of one of the sections of the Great Plains.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Final examination. June 12, 1939

Write on any 10 questions. Please place a — opposite number you omit.

1. Describe three of the "parks" of Colorado as to geology, structure, topography, and origin.

2. Explain requisite conditions for formation of "badlands" and locate two good examples in different provinces of western United States.

3. Outline physiographic history of Uinta Mts. including two different possible interpretations.

4. Describe and account for three different types of mountains in Colorado Plateau.

5. Outline physiographic history of Colorado River in Basin and Range province.

6. Give with diagrams physiographic history of central Great Plains in latitude of Denver.

7. Explain with diagrams physiographic history of Yosemite Valley.

8. Explain topography, geology and history of Great Valley of California.

9. Describe and account for three different types of mountains within Columbia Plateau.

10. What are "triangular facets"; where found; how formed; conclusions based on their presence.

11. Discuss topography, geology and history of California Coast Ranges.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Make-up examination June 1, 1939

Write on four questions only.

1. Where and what are

   (a) Henry Mts. (b) Lake Lahontan (c) Monument Uplift

   (d) Pink Cliffs (e) Salton Sea (f) Mt. Taylor

   (g) Zuni Salt Lake (h) Tularosa Basin (i) Esplinade

   (j) Craters of the Moon.

2. List physiographic (not geologic) evidences by which existence of a fault may be inferred.

3. Discuss importance of wind work in Basin and Range province.

4. Discuss two possible explanations of course of Colorado River across the Plateau.

5. Compare evidence of recent faulting in northern Great Basin and in Sonoran Desert .

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

EXAMINATION MAY 10, 1939

Write on four questions and please mark on cover which one you left out.

I. For non-majors only:-
Where and what are (a) Mesa Verde (b) Roan Cliffs (c) Chuska Mts (d) San Francisco Mt (e) Death Valley (f) Lake Bonneville (g) Zuni Mts. (h) Vermilion cliffs (i) Painted Desert (j) Great Sage Plain.

2. Complete following sentences giving but proof, (no more counted):
(a) The Grand Canyon of the Colorado was eroded in a different cycle than were the High Plateaus because
(b) Most of the cliffs in the Colorado Plateau have little talus because
(c) The early fault scarps of the Colorado Plateau were once levelled because
(d) The Henry Mountains are _____ because
(e) Because portions of the same lava flow over both on top of and at the foot of the straight edge of the range we must conclude that

3. Discuss controversy over origin of mountains of Basin and Range Province.

4. Discuss and compare two hypotheses of origin of Crater Mound, Arizona.

5. Discuss origin and discrimination of three different types of plains found in Basin and Range Province (not origin of basins themselves).

6. What evidences indicate changes in climate during the physiographic history of the Basin and Range Province.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Make-up exam. May 3, 1939

Write on four questions. Please mark which one you left out. No overtime allowed.

1. Where in provinces studied this semester could you find good examples of

   (a) mountains of horizontal volcanic flows
   (b) fault block mountain range
   (c) antecedent stream
   (d) recent volcanic crater
   (e) butte due to burning of lignite
   (f) thrust fault escarpment
   (g) anticlinal mountain
   (h) bench due to horizontal hard layer
   (i) cirque
   (j) laccolithic mountain

2. Complete following sentences giving proofs:

   (a) The western Northern Rocky Mountains differ from the Southern Rockies because
   (b) The mountains of western Idaho were deeply eroded before the eruption of the Columbia River lavas because
   (c) The scab lands were made by glacial melt water because
   (d) Falls occur in upper ~~Columbia~~ Snake River because
   (e) The Upper Grand Coulee was made by fall recession because

3. Outline physiographic history of the Yellowstone Park Plateau.

4. Account for original topography of Columbia Plateau and for course of Columbia River in the Plateau.

5. Account for origin and present distribution of the High Plains.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

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EXAMINATION April 3, 1939

Write on four questions only and please put an X opposite number of questions you left out. No overtime allowed.

1. Question for non-majors only.

Where in provinces thus far studied this semester could you find good example of (a) hogback due to thrust fault. (b) mountain front without hogbacks (c) block mountain (d) pediment (e) cirque (f) anticlinal mountain (g) recent volcanic crater (h) canyon of antecedent stream (i) mountains of eroded volcanies (j) island within lava flows

2. Complete following sentences (no more counted) giving proof of statement.

(a) The cast face of the Teton Range is straight because
(b) The levelness of the Snake River Plain is due to
(c) The scenic features of Glacier National Park are mainly due to _____ because
(d) The Rocky Mountain Front in Glacier National Park is more abrupt than in Colorado because
(e) The rivers of the Wyoming Basin cross adjacent mountain ranges because

3. (a) Describe the topography and distribution of the Scablands.
(b) Explain basic idea of two hypotheses of their origin

4. Where and What are (be brief):

(a) Callahan Divide (b) Little Rocky Mts. (c) Garden of the Gods (d) Royal Gorge (e) Harney Section (f) Waterville Palteau (g) The Race Track (h) Pecos Valley (i) Palouse country (j) Lake Missoula

5. Explain evidences for and against peneplaination of western Northern Rockies (not its date)

6. Explain at least two hypothese of the relation of drainage to structure in Yakima District, Washington.

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Make-up Examination — March 28, 1939

Write on four (4) only and please place an X on cover opposite numbers of questions left out. Please be brief as no overtime can be allowed.

(1) For non-majors only:
Where and what are (be brief):
(a) White River Plateau
(b) Longs Peak
(c) Comanche Plateau
(d) Little Missouri badlands
(e) Highwood Mts.
(f) Red Valley
(g) Pecos Valley
(h) Royal Gorge
(i) Missouri Coteau
(j) Flaxville plain

(2) Explain two hypotheses of age relations and of origins of uplands of Southern Rockies.

(3) Using diagrams give two interpretations of the physiographic history of the San Juan Mts.

(4) Explain topography, origin, and distribution of the High Plains giving two possible causes.

(5) Complete following sentences (no more counted) giving proofs:
(a) The High Plains once extended to the Rocky Mts because
(b) The Missouri Plateau has been more eroded than the High Plains because
(c) The Break of the Plains is especially prominent in Southern Kansas because
(d) The San Juan Mts. are more picturesque than the Front Range because
(e) The Colorado Piedmont was eroded during the Pleistocene because

(6) Explain briefly the geologic structure and topography of the Colorado Front Range

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES

Examination March 3, 1939

Write on four (4) only and please place an X on cover opposite numbers of questions left out. Please be brief as no overtime can be allowed.

(1) For non-majors only:
Where and what are (be brief):

(a) Edwards Plateau
(b) Pikes Peak
(c) Llano District
(d) White River badlands
(e) Devil's Tower
(f) Pine Ridge
(g) Goshen Hole
(h) Great Bend Lowland
(i) Raton Mesa
(j) Las Vegas Plateau

(2) Explain differences between a peneplain and a pediment including effect or conclusion in regard to physiographic history.

(3) Using diagrams give two distinct interpretations of the physiographic history of the Southern Rockies.

(4) Explain topography origin and distribution of the sand dune areas of High Plains.

(5) Complete following sentences (no morecounted) giving proofs:
)a) The High Plains once extended farther east because
(b) The Missouri Plateau has been tilted up on the west serveral times because
(c) There is no Break of the Plains in Nebraska because
(d) The San Juan Mts. differ from the Front Range because
(e) The High Plains were eroded during the Pleistocene because

(6) Explain briefly the geologic structure and topography of the Beach Hills.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Special Exam March 2, 1939

Write on 4 only (no overtime allowed.)

1. Where and what are (be brief):

a. Llano Estacado
b. Plains Border
c. Red Hills
d. Spanish Peaks
e. South Park
f. Park Plateau
g. North Park
h. San Luis valley
i. Royal Gorge
j. Red valley

2. Explain ~~listing~~ history of San Juan Mountains.

3. Complete following sentences (no more counted) giving proofs:

a. The Rocky Mountains were once nearly level with the Great Plains because

b. Erosion has been more rapid at the foot of the mountains than farther east because

c. The Edwards Plateau and Central Texas region have been recently uplifted because

d. Deposition on the High Plains changed to erosion because

e. Glaciers were once larger and more abundant in the Southern Rockies than now because

4. Where would you find in Great Plains and Southern Rockies good examples of

(a) Sand dunes (b) canyon of superimposed stream (c) hogbacks
(d) dissected peneplain (e) escarpment due to spring sapping
(f) lava-capped mesa (g) butte capped by burned lignite (h) loess
(i) karst topography (j) channel of glacial river.

5. Explain origin and distribution of Bad Lands.

GEOLOGY 130

Final examination June 14, 1938

Write on any 10 questions. Please mark on cover which you left out.

1. Outline with diagrams the history of the topography of the Southern Rockies under the usual hypothesis given in text.

2. Account for (a) Boston Mts. (b) Springfield Platform (c) St. Francis Mts. (d) Goshen Hole (e) Edwards Plateau. Use diagrams where needed. (f) Devils Tower (g) Pine Ridge (h) Raton Mesa (i) Race Track (j) Smoky Hills.

3. Complete the following sentences:
   (a) The Grand Canyon of the Colorado was formed in a different cycle of erosion than the escarpments of the high Plateau because
   (b) This mountain range is bounded by a fault because (two reasons)
   (c) The Great Plains are separated from the Interior Lowland because
   (d) The Henry Mts. are known to be
   (e) Because lava of the same kind occurs both on the valley floor and the top of the mountain adjacent, we must conclude that

4. State briefly two distinct explanations of the origin of the enclosed basins of the Basin and Range province.

5. Outline with diagrams the stops in the physiographic history of the Sierra Nevada (include Yosemite Valley).

6. Discuss two distinct explanations of the history of Crater Lake, Oregon.

7. Discuss two possible explanations of the course of Columbia River across the Cascades.

8. What physiographic evidences disclose anticlinal structures in (a) foothills of the Rockies, (b) Los Angeles Basin.

9. Explain the origin of the Grand Coulee, Columbia Plateau.

10. Contrast the evidence for peneplaination in (a) northern Cascades and (b) Oregon Coast Range.

11. Complete the following:
   (a) The Rocky Mountain Front was once completely buried under alluvial fans because
   (b) The Ouachita Mountains were once buried by the coastal plain sediments because
   (c) The Ozark Plateau was recently uplifted because
   (d) The San Juan Mountains were uplifted several times during glaciation because
   (e) The Mountains of the Sonoran Desert are older than those of the Great Basin because

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination May 4, 1938

Write on four questions only and please mark an X opposite number of question you left out. No overtime allowed.

(1) Question for non-majors ONLY.
Give physiographic significance or origin and tell location by province and subdivision of

(a) Henry Mts.
(b) Zuni Mts
(c) Pink Cliffs
(d) Tonto Platform
(e) Lake Bonneville
(f) Salton Sea
(g) Mt. Trumbell
(h) Kaibab Plateau
(i) Painted Desert
(j) Navajo Mt.

(2) Explain two hypotheses of origin of Crater Mound, Arizona.

(3) Compare basic ideas of the "constructional" and "destructional" theories of origin of Basin Ranges.

(4) What evidences demonstrate faulting along bottoms of certain Basin Ranges.

(5) Complete following sentences:

(a) The benches within the Grand Canyon are due to _____ because

(b) The rock terraces of the High Plateaus demonstrate a greater age than that of the Grand Canyon because

(c) The direct topographic effect of the earlier faults of the Basin and Range province has been obliterated because

(d) The Colorado River first crossed the Basin and Range Province in Pleistocene time because

(e) Talus is scanty in the Colorado Plateau because

(6) Discuss two hypotheses of drainage of Colorado Plateau.

Geology 130

PHYSIOGRAPHY OF THE UNITED STATES

April 4, 1938

Midsemester examination

Write on four questions only and please mark an X on cover to indicate which you left out.

1. Question for non-majors ONLY (required)

   Where in provinces studied this semester could you find good examples of:
   (a) hogback due to thrust fault
   (b) terminal moraine of continental glacier
   (c) dome mountain range
   (d) batholith
   (e) tepee butte
   (f) cirque
   (g) block mountain range
   (h) basin filled with stream deposits
   (i) water gap due to superimposed drainage
   (j) lake enclosed by glacial outwash

2. List in parallel columns points for and against the existence of a dissected peneplain in Northern Rockies (not the age).

3. List steps in history of Uinta Mts. as given the latest hypothesis.

4. Discuss the "Sacbland Controversy" and origin of Grand Coulee

5. Complete following sentences (no more counted).
   (a) The Snake River Plain is less eroded than the rest of the province because

   (b) Yellowstone Park is placed in the _____ Mountains instead of _____ because

   (c) The mountains of western Idaho were deeply eroded before the eruption of the Columbia River basalt because

   (d) The Northern Rockies are unlike the Southern Rockies because

   (e) Interpretation of the upland as a dissected pediment instead of a dissected peneplain simplifies the physiographic history because

6. Where and what are (be as specific as possible locating giving province, subdivision, state):
   (a) Llano Estacado
   (b) Waterville Plateau
   (c) Moses Coulee
   (d) Needle Mts.
   (e) Smoky Hills

GEOLOGY 1 30

PHYSIOGRAPHY OF THE UNITED STATES

Examination March 4, 1938

Write on four (4) only and please place an X on cover for questions left out. PLEASE BE BRIEF as no overtime can be allowed.

(1) Question may be written on by non-majors ONLY
Where and what are(tabulate giving state, physiographic province, and origin in brief):

(a) Salem Platform
(b) Cypress Hills
(c) Pikes Peak
(d) Highwood Mts.
(e) Shonkin Sag
(f) St. Francis Mts.
(g) North Park
(h) San Luis Valley
(i) Athens Plateau
(j) Race Track

(2) Compare the basic idea of two hypotheses of the age relations of the uplands of Southern Rockies.

(3) Tabulate steps in the Physiographic history of Missouri Plateau.

(4) Locate as definitely as practicable good examples of following in provinces studied this semester: (use table)

(a) Karst topography
(b) Laccolithic mountain
(c) Mesa capped by lava
(d) Novaculite ridge
(e) Entrenched meanders
(f) Sand dunes due to NW wind
(g) loess plain
(h) upland plain of river deposit
(i) butte due to burning of lignite
(j) extinct volcano

(5) Complete following sentences (no more counted):

(a) The Rocky Mountain Front was caused by
(b) The Break of the Plains indicates that
(c) The pre-Cambrian area of central Texas is lower than surrounding limestone plateau because
(d) The top of the San Juan Range is interpreted as a .... because
(e) The Edwards Plateau was recently uplifted because

(6) Explain the origin and location of the Bad Lands of Great Plains.

GEOLOGY 130
Physiography of the United States

Final Examination June 14, 1937

Write on any 10 questions and please mark on cover of bluebook which one you left out.

1. Show diagrams of (a) effect on topography of a resistant formation in an eroded overturned fold; (b), (c), (d), (e) four different structural conditions along the Rocky Mountain Front.

2. Explain with diagrams two hypotheses of history of Teton Range.

3. Discuss two explanations of Crater Mound, Arizona.

4. Explain with diagrams three types of mountains within the Colorado Plateau.

5. Outline physiographic history of Sierra Nevada and great valley of California.

6. What topographic evidences of anticlines in (a) foothills of Rockies, (b) Los Angeles Basin.

7. Explain origin of Grand Coulee of Columbia Plateau.

8. With reference to Klamath Mts. explain (a) geology, (b) topography, (c) physiographic history (brief), (d) relation to adjacent mountains.

9. Discuss problem of aggradation of present through stream beds in High Plains.

10. Complete the following sentences:

    (a) The Rocky Mountain Front was once completely concealed by Tertiary stream aediments because

    (b) The Ouachita Mts. were once concealed by the Coastal Plain sediments because

    (c) The Ozark Plateau has been recently uplifted because

    (d) The San Juan Mts. were uplifted several times during glaciation because

    (e) The mountains of the Sonoran Desert are older than those of the northern Great Basin because

11. How can you tell a "fault scarp" from a "fault line scarp"?

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination May 7, 1937

Write on any four questions and please do not forget to mark on cover of your books which one you left out.

NO OVERTIME ALLOWED

1. Where in Colorado Plateau or Basin and Range provinces could you find outstanding examples of:

   (a) fault scarp (b) volcanic neck (c) uneroded laccolith (d) anticlinal valley (e) pediment (f) fault block mountain capped by lava (g) pleistocene beach (h) peneplain preserved under lava (i) sink hole (j) bolson
   (Give locations briefly with no discussion.)

2. Describe and account for two different types of escarpments in the Colorado Plateau.

3. Complete the following sentences (no more counted):

   (a) The Grand Canyon of the Colorado was formed in a different cycle of erosion than were the cliffs of the High Plateaus because

   (b, c) It has been concluded that this "Basin Range" is a fault block because (two reasons)

   (d) The course of Colorado River across the Plateau, once termed antecedent, is known to be because

   (e) The direct topographic effect of the earlier faults of the Colorado Plateau was obliterated because

4. Discuss the significance of studies along the Lower Colorado upon interpretation of physiographic history of the region.
   (Give the main facts only of the history thus determined.)

5. Discuss briefly evidence for and against the importance of wind erosion in the Basin and Range Province.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Midsemester examination April 5, 1937

Write on four questions. Please mark on cover which one left out.

1. Where in provinces studies this semester could you find good examples of
   (a) mountains of horizontal volcanics
   (b) fault block-mountain
   (c) canyon of antecedent stream
   (d) recent volcanic craters
   (e) sand dunes
   (f) eroded alluvial plain
   (g) hogbacks due to thrust faults
   (h) lava plain
   (i) anticlinal mountain
   (j) benches due to difference in hardness of bedrock

2. Explain fully the differences in origin and topography of peneplains and pediments.

3. (a) Describe the topography of the scabland district.
   (b) Explain controversy over its origin.

4. Where and what are (be brief):
   (a) Royal Gorge
   (b) Callahan divide
   (c) Boston Mts.
   (d) Plains border
   (e) Lake Missoula
   (f) Poverty Flat
   (g) Absoraka Range
   (h) Pine Ridge
   (i) Great Divide Basin
   (j) San Luis Valley

5. Complete the following sentences (no more counted):

   (a) The plateau topography of the western Northern Rockies is due to

   (b) The Rocky Mountain front is due to erosion consequent on regional, not local, uplift because

   (c) The Ouachita Mountains preserves remnants of two peneplains because

   (d) The Snake River Plain is so level because

   (e) The mountains of Glacier National Park are more scenic than those of the Columbia ranges farther west because

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Examination March 8, 1937

Write on four questions and please mark on cover which one you left out. Be brief and to the point avoiding information not called for.

1. Where and what are (tabulate and give state, province and physiographis significance.)
   (a) Little Rocky Mts.
   (b) Crazy Mts.
   (c) Balcones escarpment
   (d) Raton mesas
   (e) Coteau du Missouri
   (f) Pine Ridge
   (g) Pecos valley
   (h) Devil's Tower
   (i) South Park
   (j) Royal Gorge

2. Locate examples studied this semester of (a) laccolithic mountain, (b) hogback, (c) cuesta, (d) tepee butte, (e) entrenched meanders, (f) valley of glacial river, (g) novaculite, (h) glacial lake bed, (i) terminal moraine, (j) butte due to burned lignite.

3. Complete the following sentences (no more counted):
   (a) The Rocky Mountain front was once buried under Tertiary sediments because
   (b) The High Plains once extended much farther north because
   (c) The High Plains once extended much farther east because
   (d) The Ozark Plateau has been recently uplifted because
   (e) The top of the San Juan Mountains is interpreted as a peneplain because

4. Discuss the evidence for and against the presence of remnants of several different pemeplains in the Front Range of Colorado giving alternative hypotheses. (Use diagrams)

5. Outline with diagrams the physiographic history of the Ouachita Mountains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Examination March 8, 1937

Write on four questions and please mark on cover which one you left out. Be brief and to the point avoiding information not called for.

1. Where and what are (tabulate and give state, province and physiographis significance.)
   (a) Little Rocky Mts.
   (b) Crazy Mts.
   (c) Balcones escarpment
   (d) Raton mesas
   (e) Coteau du Missouri
   (f) Pine Ridge
   (g) Pecos valley
   (h) Devil's Tower
   (i) South Park
   (j) Royal Gorge

2. Locate examples studied this semester of (a) laccolithic mountain, (b) hogback, (c) cuesta, (d) tepee butte, (e) entrenched meanders, (f) valley of glacial river, (g) novaculite, (h) glacial lake bed, (i) terminal moraine, (j) butte due to burned lignite.

3. Complete the following sentences (no more counted):

   (a) The Rocky Mountain front was once buried under Tertiary sediments because

   (b) The High Plains once extended much farther north because

   (c) The High Plains once extended much farther east because

   (d) The Ozark Plateau has been recently uplifted because

   (e) The top of the San Juan Mountains is interpreted as a peneplain because

4. Discuss the evidence for and against the presence of remnants of several different pemeplains in the Front Range of Colorado giving alternative hypotheses. (Use diagrams)

5. Outline with diagrams the physiographic history of the Ouachita Mountains.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Final Examination June 16, 1936

Write on 10 questions and please mark on cover of book which you left out.

(1) Where in western U. S. could you find a good example of: (a) active volcano, (b) block mountain due to recent faulting, (c) Pleistocene beach, (d) abandoned waterfall, (e) mesa capped by lava, (f) escarpment capped by gravel, (g) rock step, (h) young lava plain, (i) hogback of sandstone, (j) deep canyon in lava

(2) Where and what are: (a) Springfield Platform, (b) Crater Lake, (c) Lake Tulare, (d) High Plateaus of Utah, (e) San Juan Mts., (f) Crazy Mts., (g) Craters of the Moon, (h) Hurricane Ledge, (i) Marysville Buttes, (j) Smoky Hills.

(3) Discuss two possible hypotheses for the drainage of the Columbia Plateau.

(4) Outline the Physiographic history of the Sierras.

(5) What physiographic evidences indicate faulting?

(6) What physiographic evidences demonstrate relatively recent changes in level of the Pacific Coast?

(7) Describe the land forms and summarize the physiographic history of the Angeles Section.

(8) How may one distinguish an escarpment due to recent faulting?

(9) Account for the form of the shoreline of Puget Sound

(10) What effects did continental glaciation have on the topography of the Great Plains?

(11) Discuss the importance of wind erosion in western U. S.

early exam 36

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final examination, June ~~17, 1930~~ 12 1936

Write on TEN (10) questions INCLUDING THE first TWO (2)

1 ✓ (1) See other sheet. Be sure to put your name on this page and put it in your bluebook. Complete all three (3) block diagrams using specified symbols. Show both rock character and rock structure.

2 ✓ (2) Refering to the block diagrams tell (a) the physiographic history demonstrated by each, (b) where an example of each might be found in western U. S.

Write on eight (8) of the following questions

(3) Discuss the physiographic history of Crater Lake, Oregon, using diagrams

(4) Account for the Colorado Piedmont and state where other features of the same origin are found in western U. S.

(5) Discuss the nature and origin of the "Scablands"

6 ✓ **(6) Where and what are: (a) Marysville Buttes, (b) Malheur Lake, (c) flatirons, (d) Blue Mountains of Oregon, (e) The Red Valley**
with others (6)

(7) Account for the fact that some volcanic eruptions in the western U. S. resulted in peaks and others in plains; give illustrations of each

(8) State the evidence of past climatic changes in the Basin and Range Province giving their probable relation to glaciation

8 ✓ **(9) What has been the effect of vulcanism on the topography of the Great Plains?**

(10) Explain the physiographic history of the Imperial Valley, California

9 ✓ **(11) Account for the formation of "Bad Lands" and locate examples**

early Exam 1936

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final Examination, June 15, 1931

Write on first two (2) and any eight of other questions or TEN (10) in all. Anyone writing on more will be graded on first ten questions written, order in book to determine, not numbers of questions except first two.

(1) Considering block A only give three (3) possible explanations of the rock character and rock structure using the small cross sections below on the assumption that it is known that the rock in the two ridges is the SAME FORMATION. Use regular symbols on the sections but explain them. Now consider the problem in the light of block B as well and fill in the explanation on the sides of the blocks themselves.
DO NOT FORGET YOUR NAME ON THE PAPER

(2) (a) Fill in the structure and rock character on sides of blocks.
(b) Give two (2) examples of this kind of topography in western U. S.

3 ✓ (3) Illustrate by cross sections (a) structure of Rocky Mountain Front in Colorado; (b) same in Glacier National Park. With each explain the effect on scenic character of the region.

4 ✓ (4) Explain fully two (2) criteria which positively distinguish a fault scarp from a fault line scarp.

5 ✓ (5) Explain the physiographic history of Puget Sound

6 ✓ (6) Where and what are: (a) Grand Coulee, (b) Moses Lake, (c) "The Potholes", (d) Mount Shasta, (e) Hurricane Ledge include also the other (6)

7 ✓ (7) Outline the physiographic history of the Sierra Nevada using cross sections for each step

(8) Explain the nature, occurence, and origin of rock pediments

(9) Contrast two distinct theories of the origin of enclosed basins in western U. S.

10 ✓ (10) Where in western U. S. (be as specific as possible) would you find: (a) area of old alluvial fans now undergoing erosion, (b) large area of active sand dunes, (c) active volcano, (d) peneplain buried under lava flow, (e) large river following a course positively known to be antecedant

11 ✓ (11) Discuss the origin, topography, and subdivisions of the Great Valley of California

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination, May 8, 1936

Write on any four questions.

1. Discuss with diagrams the physiographic history of the Colorado Plateau.

2. Give physiographic significance and tell which province each is located in:

   (a) Henry Mts.
   (b) Esplinade
   (c) Vermilion Cliffs
   (d) Tularosa Basin
   (e) Lake Lahontan
   (f) Zuni Salt Lake
   (g) Mt. Taylor
   (h) Chuska Mts.
   (i) Salton Sea
   (j) Humboldt Range

3. Discuss two explanations of the enclosed basins of Basin and Range Province.

4. Define and discuss origin of <u>pediments</u>.

5. Discuss origin of Crater Mound, Arizona.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Midsemester examination April 6, 1936

Write on any four (4) questions. Please mark on cover the question you omitted.

(1) Where in provinces studied this semester could you find:
- (a) buttes due to natural clinker
- (b) exhumed pre-Cambrian peneplain
- (c) extensive area of uneroded alluvial fans
- (d) fault block mountains
- (e) exhumed pre-Pennsylvanian peneplain

(2) Where and what are (be brief and explain geologic structure with diagrams where necessary:
- (a) Red Valley
- (b) Red Hills
- (c) Coteau du Missouri
- (d) Llano Estacado
- (e) Waterville Plateau

(3) State the facts for and against the hypothesis of one or more upland peneplains in the Northern Rockies.

(4) List and compare three hypotheses of drainage relations in vicinity of Yakima, Wash., and two hypotheses of the course of Snake River across the Columbia Plateau. (Be brief.)

(5) Discuss hypotheses of origin of Grand Coulee and associated features.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination, March 9, 1936

Write on 4 questions only. Use diagrams wherever they will help but be sure to explain everything shown on them. Make no assumptions. BE BRIEF AND TO THE POINT.

1. Illustrate by means of cross sections:
   (a) Effect on topography of Ouichitas of folded strata.
   (b) Why hogbacks are present only along parts of the Rocky Mountain front.

2. Where and what are (be brief):
   (a) St. Francis Mts.
   (b) Royal Gorge
   (c) Colorado Piedmont
   (d) Little Rocky Mts.
   (e) The Race Track

3. Explain briefly the origin and geologic structure of;
   (a) High Plains
   (b) Edwards Plateau
   (c) Springfield Platform
   (d) Boston Mts.

4. Outline the physiographic history of the Missouri Plateau.

5. Outline with diagrams the physiographic history of the Colorado Front Range and the adjacent Great Plains as far east as the High Plains. Explain everything on your diagrams making no assumptions with regard to commonly used symbols.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final examination, June 8, 1935

Write on ten (10) questions and please mark one you left out on cover of your bluebook.

(1) Discuss the origin and topography of the Yellowstone Plateau including its scenic features; tell why it is in the province of which it is a part.

(2) Compare the topography of the Southern and Northern Rockies and account for the differences.

(3) Discuss the two explanations which have been given for the benches within the Grand Canyon of the Colorado.

(4) Explain the physiographic history of the Puget Sound district.

(5) Discuss the location of the boundary between the Basin and Range province and the Columbia Plateau.

(6) Account for the fact that some volcanic eruptions in western U. S. resulted in peaks whereas others formed plains; locate a good example of each.

(7) Explain the two hypotheses which have been used to explain the canyon of Green River through the Uinta Mountains.

(8) Locate examples in the Great Plains of four topographic forms which resulted from vulcanism.

(9) Discuss the evidences for and against the two hypotheses of the origin of Crater Lake, Oregon.

(10) Discuss the importance of wind work in the Basin and Range province.

(11) Outline with diagrams the steps in the physiographic history of the Columbia Plateau.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination, May 15, 1935

Write on four (4) questions and mark one left out.

1. Where in Colorado Plateau or Basin and Range provinces would you find: (a) Laccolithic Mountain, (b) Fault line scarp, (c) Scarp due to monoclinic, (d) Fault scarp, (e) recent volcano, (f) lava-capped plateau, (g) fault block of lava, (h) abandoned lake shore, (i) anticlinal mountain, (j) anticlinal valley.

2. Explain the physiographic history of the Colorado Plateau.

3. Explain two different theories of the origin of Crater Mound, Arizona.

4. Describe and account for two different types of escarpments found in the Colorado Plateau.

5. Complete the following sentences:

   (a) The Colorado Plateau is separated from the Basin and Range province

   because

   (b) The benches within the Grand Canyon of the Colorado are due to

   (c) The Henry Mountains are known to be _____

   because

   (d) Because lava of the same kind occurs both on the valley floor and the top of the "Basin Range" we conclude that

   (e) Because the foot of the "Basin Range" is straight we conclude that

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester Examination, April 10, 1935

Write on any four questions and mark on cover the one you left out.

(1) Where in region studied this semester would you find good examples (one each) of:

(a) sand dunes
(b) ridge due to hard layer in overturned fold
(c) exhumed pre-Cambrian mountains
(d) remnants of two successive penplains
(e) lake shut in lava flow
(f) anticlinal mountain with hog back foothills
(g) mountain front due to thrust faulting
(h) antecedant stream valley
(i) benches due to differences in hardness of formations
(j) volcanic mountain

(2) Explain the controversy over the "Tertiary Basins" of the northern Rockies

(3) Complete the following sentences:
(a) The western part of the Northern Rockies is unlike the Southern Rockies because----
(b) The mountains of western Idaho were deeply eroded before the eruption of the Columbia River lavas because------
(c) The Snake River Plain has not been as deeply eroded as the rest of the provincebecause----
(d) Yellowstone Park is strictly not in the Rocky Mountains because------
(e) Green River eroded a gorge across the Uinta Mountains because-------

(4) Expalin the history of the Scablands and the Grand Coulee

(5) Where and what is physiographic significane of:

(a) Poverty Flat
(b) Red Hills
(c) Blue Mountains
(d) Pine Ridge
(e) Bitterroot Range
(f) Absoraka Range
(g) Teton Range
(h) Great Divide Basin
(i) San Luis Valley
(j) South Park

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, March 13, 1935

Write on any four questions

(1) Tell where are and what are (be brief):
(a) St. Francis Mts.
(b) Coteau du Missouri
(c) ~~KKKKK~~ Rocky Mts.
Little
(d) The Race Track
(e) Spanish Peaks

(2) Locate examples studied this semester of:
(a) karst topography, (b) laccolithic mt., (c) fault~~H~~t escarpment, (d) lava-capped mesa, (e) ridges due to novaculite, (f) river valley used only during glaciation, (g) isolated remnant of fluvial mantle of Great Plains, (h) gorge caused by superimposed stream, (i) entrenched meanders, (j) stripped plain

(3) Explain the origin and nature of the Colorado Piedmont and name another similar subdivision of same province.

(4) Complete the following sentences:
(a) The Rocky Mts. were once almost on a level with the Great Plains because-----
(b) The High Plains once extended farther east than they now do because------
(c) The Ouachita Mts. were once buried by the Coastal Plain because---
(d) The three uplands of the Ozark Plateau cannot be successive peneplains because---
(e) The top of the San Juan Mts. is not the original lava surface because----

(5) Describe and account for the topography of the Llano District of Texas.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, May 4, 1934

Write on any four (4) questions and PLEASE mark on outside of cover the one you left out.

(1) Where (give province and subdivision as well as state) and what land form or principle of physiography is illustrated by:
(a) Henry Mts, (b) Craters of the Moon, (c) Scablands, (d) Echo Cliffs, (e) Zuni Mts., (f) Thousand Springs, (g) High Plateaus of Utah, (h) Chuska Mts., (i) "The Potholes, (j) San Francisco Mt.

(2) Discuss with diagrams the physiographic history of the Colorado Plateau. Explain each diagram enough to give a connected story.

(3) Refering to the Basin and Range Province discuss (a) topographic evidences of faulting and (b) toppographic evidences of recent faulting causing the present topography.

(4) Discuss and compare the two rival explanations of Crater Mound, Arizona

(5) Discuss the origin and discrimination of four (4) kinds of plains which occur in desert regions.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester examination, March 30, 1934

Write on any four (4) questions and please mark one left out.

(1) Where (include province and subdivision) and what (be brief) are:
(a) San Juan Mts. (b) Pine Ridge escarpment
(c) Boston Mts. (d) Arbuckle Mts. (e) Lake Missoula

(2) Define and locate an example of each in area studied this semester: (a) flatiron (b) tepee butte (c) alluvial apron (d) exhumed peneplain (e) cirque (f) entrenched meander (g) superimposed stream (h) consequent stream (i) dome mountain (j) block mountain

(3) Explain and contrast the effects of alpine and continental glaciation on the scenery of mountains and locate examples in areas thus far studied.

(4) Discuss the evidences for and against the existence of dissected peneplains in the mountains of Idaho (not their age or ages).

(5) Explain with diagrams the relation between topography and geologic structure in: (a) Glacier National Park (b) Rocky Mountain Front just north of Colorado Springs (c) on E-W line across Missouri through St. Francis Mts. (d) San Luis Valley, Col. (e) Break of the Plains in northern Kansas.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, March 5, 1934

Write on first two questions and on two others making four (4) in all. Anyone writing on more questions will be graded on Nos. 1 and 2 and the first two others written in book regardless of their numbers.

Required questions-PLACE NAME ON SHEET FIRST. blocks used for 1931 final
(1) (a) If you had only block A to consider what three distinct explanations of the geologic structure might you reasonably draw PROVIDED it is known that the SAME FORMATION MAKES UP BOTH OF THE RIDGES. Show these explanations on the small sections below.
(b) Next consider also block B and illustrate your final conclusion as to the geology on the sides of the blocks.
(c) Write on the sheet the location of an example of this kind of topography and geology in regions thus far studied this semester.

(2) (a) Fill in the sides of the block with a reasonable explanation of the geology which would give rise to such topography.
(b) Write on the sheet the location of an example of this kind of geology and topography in regionsstudied this semester.

DO NOT PUT ANSWERS IN BLUEBOOK OR INDULGE IN DISCUSSION OF INFORMATION NOT ASKED FOR. Please remember that neatness counts.

Write on any two of the following questions.

(3) Locate examples in regions studied this semester of (a) bed of extinct glacial lake, (b) terminal moraine~~xx(x)~~ of continental glacier, (c) ridges due to vertical sedimentary strata, (d) mesa capped by lava flow, (e) slightly eroded volcano, (f) laccolithic mountain, (g) remnants of peneplain on tops of granite mountains, (h) escarpment due to spring sapping, (i) butte capped by natural clinker, (j) karst topography

(4) Complete the following statements in SINGLE SENTENCES each of which states evidence which alone proves the point:
(a) The Rocky Mountain front was once completely buried under alluvial fans because-----
(b) The High Plains once extended north across South Dakota and Montana because--------
(c) The Ouachita Mountains were once buried by the sediments of the Coastal Plain because------
(d) The Ozark Plateau was recently uplifted because-----
(e) The San Juan Mountains were recently uplifted because----

(5) Where (include province and subdivision) and what are (be brief):
(a) ~~Devils~~ Devils Tower, (b) Llano Estacado, (c) Stockton Plateau,
(d) Pecos Valley, (e) San Luis Valley

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final examination, June 12, 1933

Write on any ten (10) questions. PLEASE mark question left out.

(1) Account for the origin and present distribution of the High Plains.

(2) Explain the conditions necessary for the origin of bolsons and locate two good examples in western United States.

(3) Discuss two distinct theories of the origin of Cruber Mound (Coon Butte), Arizona.

(4) Outline with diagram the physiographic history of the Sierra Nevada Mountains including the Yosemite Valley.

(5) Explain the origin of mountain peneplains.

(6) Describe the physiographic evidence which indicates recent changes in level of the land on the Pacific coast.

(7) Explain the physiographic history of the Yakima district, Washington.

(8) What evidences suggest that mountain building is still in progress in California?

(9) What physiographic evidence could you use to locate anticlinal structures in (a) foothills of the Rockies and (b) Los Angeles basin? Explain fully.

(10) How are hanging valleys produced? Give definite examples of such process in western United States.

(11) Account for the shore outline of Puget Sound.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, May 5, 1933

Write on four questions. Please mark question left out.

1. Where and what are:
   (a) Lake Bonneville
   (b) Grand Coulee
   (c) San Francisco Plateau
   (d) Mesa Verde
   (e) Roan Cliffs

2. Discuss the controversy over the origin of the Basin Ranges.

3. Discuss two possible explanations of the course of Colorado River across the Colorado Plateau.

4. Discuss evidence for and against the excavation by wind of basins in the Basin and Range Province.

5. Discuss the controversy over the origin of the Scablands.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester examination, April 3, 1933

Write on any four questions. Please mark question omitted on cover. Grades not available until after vacation.

1. Where in provinces studied this semester could you find good examples of:
   (a) uneroded lava plain
   (b) cinder cone
   (c) mountains composed of eroded volcanics
   (d) gorge due to superimposed stream
   (e) gorge ascribed to antecedent stream
   (f) extinct lake due to vulcanism
   (g) hogbacks due to thrust faults
   (h) lake shut in by glacial outwash
   (i) extinct lake due to ice dam
   (j) interior drainage

2. Discuss the controversy over the Idaho peneplains and their ages.

3. Account for the differences in history of the unglaciated northern and central Great Plains.

4. What physiographic and geologic factors account for the differences in scenic features of (a) Glacier National Park and (b) Rocky Mountain National Park in the Colorado Front Range?

5. (a) Contrast and explain effects on mountains of continental and local glaciation giving examples.
   (b) May both be found in same range? Explain and locate examples.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, March 6, 1933

Write on any five (5) questions. Anyone writing on more will be graded on first five written in book regardless of numbers. PLEASE mark on cover the question you left out.

(1) Where and what are (be definite yet brief):
- (a) White River Plateau
- (b) Pine Ridge escarpment
- (c) Edwards Plateau
- (d) Coteau du Missouri
- (e) Boston Mountains

(2) Outline with diagrams the physiographic history of the Ouachita Mountains with portion of adjacent Coastal Plain.

(3) Where in districts so far studied this semester could you find good examples of:
- (a) sand dunes
- (b) exhumed peneplain
- (c) extinct volcano
- (d) confluent alluvial fans
- (e) ridges developed on overturned folds
- (f) loess plain
- (g) cirque
- (h) butte due to burned lignite
- (i) butte due to concretion
- (j) novaculite ridges

(4) Outline with diagrams the physiographic history of the Colorado Front Range and Great Plains in latitude of Kansas.

(5) Explain with diagrams the geologic structure and topography of:
- (a) Rocky Mountain Front with hogbacks
- (b) Same where no hogbacks are present
- (c) Black Hills
- (d) North Park
- (e) Raton Mesas

(6) What effects did mountain glaciation have on scenery of the Rocky Mountains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, May 11, 1932

Write on five (5) questions. Anyone writing on more will be graded on first five written in book. PLEASE MARK QUESTION OMITTED on cover of your bluebook.

(1) Discuss two distinct theories of the origin of Crater Mound or Coon Butte, Arizona

(2) Where in Columbia Plateau, Colorado Plateau, or Basin and Range Province would you find (give as definite a location as possible) ONE example of:
(a) trinagular facet
(b) laccolithic mountain
(c) dome mountain
(d) geologically recent volcanic mountain
(e) basin enclosed by delta

(3) Where and what are (be brief):
(a) Tularosa Basin
(b) Craters of the Moon
(c) Scablands
(d) Kaibab Plateau
(e) Lake Lahontan

(4) Discuss two distinct explanations of the origin of the enclosed basins of the Basin and Range Province.

(5) Discuss two distinct explanations of the relation of the present drainage to rock structure in the Colorado Plateau.

(6) Discuss two distinct explanations of the benches within the Grand Canyon of the Colorado.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester examination, April 4, 1932

Write on any five (5) questions. Anyone writing on more will be graded on first five written in book regardless of numbers. Please mark on cover the question you omitted. Grades not available until after vacation.

(1) Where in provinces studied this semester could you find:
(a) flatiron
(b) exhumed pre-Cambrian monadnock
(c) an extensive area of sand dunes
(d) uneroded lake plain in intermontane basin
(e) cirque eroded in approximately horizontal strata

(2) Explain the history and origin of the basin of Yellowstone Lake starting with origin of bed rock.

(3) Outline with diagrams the physiographic history of the Ouachita Mountains and adjacent Coastal Plain.

(4) Account for the origin of the original surface of the Columbia Plateau.

(5) Compare the topography of the Northern and Southern Rockies and account for the differences (include foothills).

(6) Where and what are (explain geologic structure with diagrams):
(a) Race Track
(b) Smoky Hills
(c) Owyhee Mts.
(d) Edwards Plateau
(e) Teton Range

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, March 7, 1932

Write on four (4) questions only. Anyone writing on more will be graded on first four written in book regardless of their numbers.

(1) Where and what are (please be brief):
(a) Springfield platform
(b) Wichita Mountains
(c) Devils Tower
(d) West Elk Mountains
(e) Red Hills

(2) Outline with diagrams the physiographic history of the Arbuckle Mountains and show their relation to the Coastal Plain and Ouachita Mountains. Be sure to explain everything on your diagrams making no assumptions as to common symbols.

(3) Outline with diagrams the physiographic history of the Colorado Front Range and the adjacent Great Plains as far east as the Break of the Plains. Explain everything on your diagrams making no assumptions with regard to commonly used symbols.

(4) Explain briefly preferably with diagrams the origin and geologic structure of: (do not enter on physiographic history)
(a) Boston Mountains
(b) Goshen Hole
(c) curved ridges with gentle slope of both limbs in same direction which occur near Hot Springs, Arkansas
(d) San Juan Mountains
(e) North Park

(5) Describe briefly the important features and districts with their geologic interpretation which you would see if you traveled from San Antonio, Texas, slightly west of north over the Great Plains to the Canadian border. Pay especial attention to boundaries between subdivisions of the Great Plains. Slight deviation from a straight line is permitted.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Examination, Feb. 28, 1930

Your name only is needed- do not waste time filling in other blanks

Write on all questions

(1) Draw a topographic and geological cross section from where Red River crosses the west line of Arkansas northeast through the St. Francis Mountains

(2) Account for the origin and present distribution of the High Plains

(3) Where and what are (a) Devils Tower, (b) Goshen Hole, (c) Pine Ridge Escarpment, (d) Edwards Plateau, (e) Raton Mesas

(4) Give a geologic and topographic cross section of the Black Hills labling the principal features

(5) Outline the physiographic history of the northern Great Plains

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester examination, March 31, 1930

Write on five (5) questions

(1) Discuss the field evidence which leads to the conclusion that there have been not less than two cycles of erosion in Idaho during the Tertiary Period. Discuss the evidences which have been used to date the times of completion of these cycles.

(2) Outline with diagrams having explanations with them the history of the topography of the Southern Rockies and adjacent Great Plains since the uplift of the Cretaceous strata.

(3) Where and what are: (a) Front Range
(b) San Juan Mountains
(c) North Park
(d) Break of the Plains
(e) Salem platform

(4) Draw two sections showing the geology and topography of the Rocky Mountain Front in (a) Colorado, and (b) Glacier National Park

(5) What two causes may have accounted for the alternate aggradation and degradation of the Great Plains. Use diagrams

(6) Give at least two reasons for dividing the Great Plains from the Interior Lowland and Ozark Plateau; include a discussion of the eastern boundary of the Great Plains

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
May 9, 1930

WRITE ON FOUR QUESTIONS

1. Explain two important differences in topography and rock structure between andaverage mountain range of the Basin and Range prowinve and a range in the Southern Rockies.

2. (a) Name, locate (in general way) and account for three different types of mountains within the area of the Colorado Plateau .

(b) Account for two different types of escarpments between plateaus and tell how they can be distinguished.

3. Discuss two separate theories of the origin of Coon Butte or Meteor Mt., Ariz.

4. Draw a cross section of the Grand Canyon of the Colorado showing and naming the rock formations and account for the relation between rock character and topography.

5. Explain and tell where the foldowing are found in Colorado Plateau or Great Basin.

(a) fault scarp
(b) triangular facet
(c) alluvial fan
(d) bolson
(e) hangingvalley (not due to glaciation)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final examination, June 17, 1930

Write on TEN (10) questions INCLUDING THE first TWO (2)

(1) See other sheet. Be sure to put your name on this page and put it in your bluebook. Complete all three (3) block diagrams using specified symbols. Show both rock character and rock structure.

(2) Refering to the block diagrams tell (a) the physiographic history demonstrated by each, (b) where an example of each might be found in western U. S.

Write on eight (8) of the following questions

(3) Discuss the physiographic history of Crater Lake, Oregon, using diagrams

(4) Account for the Colorado Piedmont and state where other features of the same origin are found in western U. S.

(5) Discuss the nature and origin of the "Scablands"

(6) Where and what are: (a) Marysville Buttes, (b) Malhour Lake, (c) flatirons, (d) Blue Mountains of Oregon, (e) The Red Valley

(7) Account for the fact that some volcanic eruptions in the western U. S. resulted in peaks and others in plains; give illustrations of each

(8) State the evidence of past climatic changes in the Basin and Range Province giving their probable relation to glaciation

(9) What has been the effect of vulcanism on the topography of the Great Plains?

(10) Explain the physiographic history of the Imperial Valley, California

(11) Account for the formation of "Bad Lands" and locate examples

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, March 16, 1931

Write on all questions. Use diagrams wherever they will help but be sure to explain everything shown on them. Make no assumptions. BE BRIEF AND TO THE POINT.

(1) Explain with diagrams the history of the topography of the San Juan Mountains of Colorado from the uplift of the Cretaceous sediments to the present.

(2) Illustrate by means of cross sections:
(a) Effect on topography of Ouachitas of folded strata.
(b) Why hogbacks are present only along parts of the Rocky Mountain front.

(3) Where and what are (be brief):
(a) St. Francis Mts.
(b) Royal Gorge
(c) Rabbit Ears Mts.
(d) Little Rocky Mts.
(e) The Race Track

(4) Explain briefly the origin and geologic structure of:
(a) Colorado Piedmont and High Plains
(b) Edwards Plateau
(c) Coteau du Missouri
(d) Boston Mts.

(5) Explain the direct and indirect effects of mountain glaciers in the Southern Rockies.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Midsemester examination, April 3, 1931

Write on five (5) questions

(1) Explain the history and origin of the basin of Yellowstone Lake including associated features of the vicinity.

(2) Illustrate with cross sections two (2) possible histories of the Teton Range

(3) Where and what are:
- (a) Valley of Clark Fork of Columbia River
- (b) Gros Ventre Range
- (c) Callahan Divide
- (d) Wichita Mountains
- (e) Needles Mountains

(4) Give very briefly the essential facts about the major topographic features including their origin which a traveller might see crossing in a nearly straight line west from ~~Laramie~~ Cheyenne Wyoming to Salt Lake, Utah

(5) Where in the provinces studied thus far this semester could you find:
- (a) exhumed pre-Cambrian peneplane
- (b) hogback due to Dakota sandstone
- (c) volcanic cone
- (d) moderately dissected lava flows (not mountains)
- (e) erosional escarpment in nearly horizontal strata

(6) Explain briefly the unique topographic features and their origin which serve to attract tourists to Glacier National Park

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Examination, May 8, 1931

Write on four (4) questions. Anyone writing on more will be graded on first four only, order in book determining, not numbers of questions. Please indicate which you left out.

(1) State briefly where and what are:
- (a) Chuska Mts.
- (b) Henry Mts.
- (c) Circle Cliffs
- (d) Mexican Highland (in U. S.)
- (e) Crater Mound (Coon Butte)

(2) Discuss two (2) alternative explanations of the topography of the Basin and Range province.

(3) Outline the history of the topography of the Colorado Plateau since the uplift of the Cretaceous rocks

(4) Describe and illustrate by cross sections the boundary between the Basin and Range province and the Colorado Plateau

(5) Where in Basin and Range or Colorado Plateau would you find ONE example of:
- (a) young block mountain
- (b) Pleistocene beach line
- (c) Recent volcanic cone
- (d) incised meander
- (e) rock pediment

Note: only definite names or locations given full credit

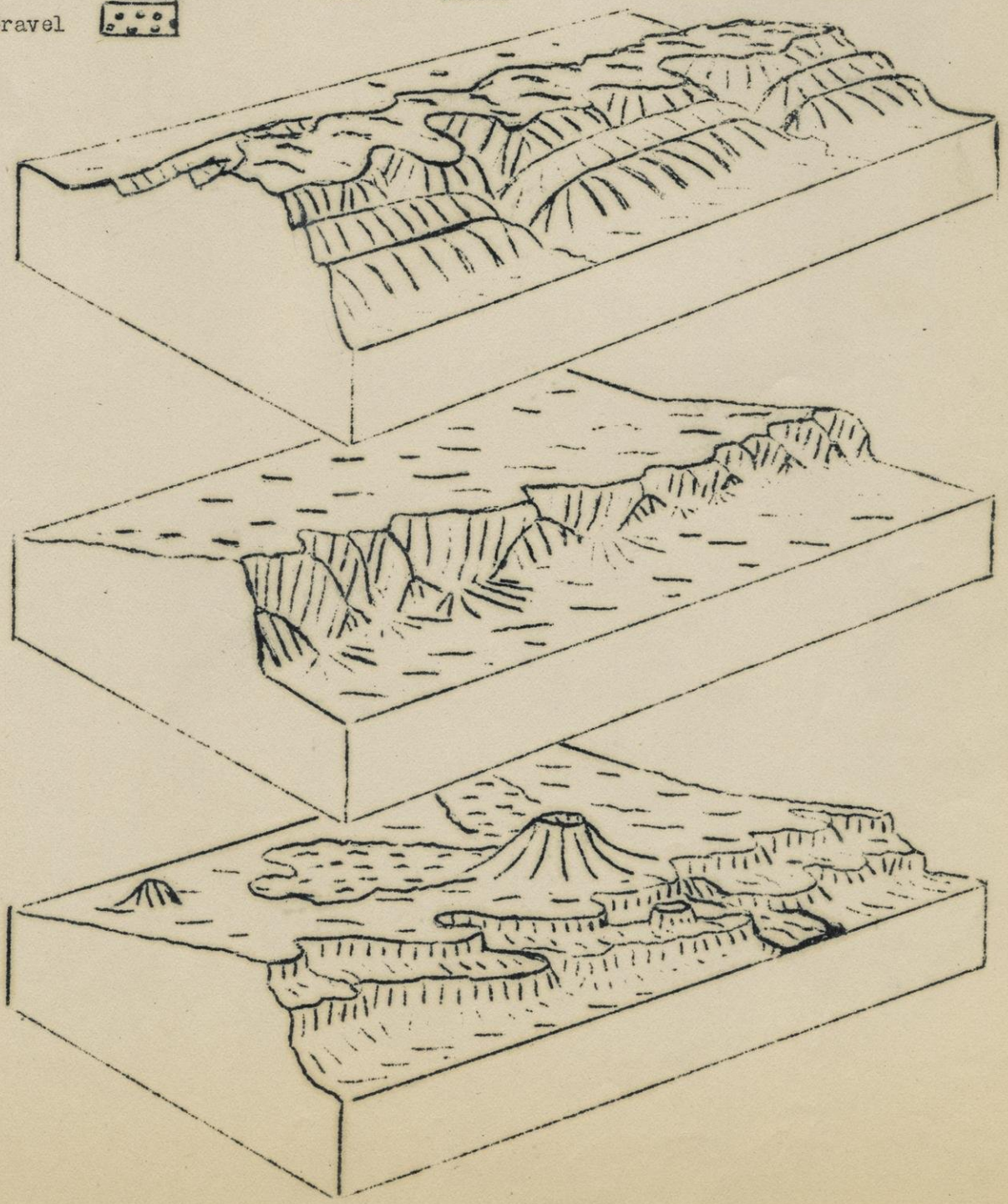
Geology 130
PHYSIOGRAPHY OF THE UNITED STATES
Final Examination, June 17, 1930

Question (1) Required of all Write your name here FIRST.....

Complete all of the block diagrams below showing (a) rock character and (b) structure. Use following symbols; show direction of movement of faults

Sandstone Limestone Shale Granite etc. Lava

Gravel



GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Final Examination, June 15, 1931

Write on first two (2) and any eight of other questions or TEN (10) in all. Anyone writing on more will be graded on first ten questions written, order in book to determine, not numbers of questions except first two.

(1) Considering block A only give three (3) possible explanations of the rock character and rock structure using the small cross sections below on the assumption that it is known that the rock in the two ridges is the SAME FORMATION. Use regular symbols on the sections but explain them. Now consider the problem in the light of block B as well and fill in the explanation on the sides of the blocks themselves.
DO NOT FORGET YOUR NAME ON THE PAPER

(2) (a) Fill in the structure and rock character on sides of blocks.
(b) Give two (2) examples of this kind of topography in western U. S.

(3) Illustrate by cross sections (a) structure of Rocky Mountain Front in Colorado; (b) same in Glacier National Park. With each explain the effect on scenic character of the region.

(4) Explain fully two (2) criteria which positively distinguish a fault scarp from a fault line scarp.

(5) Explain the physiographic history of Puget Sound

(6) Where and what are: (a) Grand Coulee, (b) Moses Lake, (c) "The Potholes", (d) Mount Shasta, (e) Hurricane Ledge

(7) Outline the physiographic history of the Sierra Nevada using cross sections for each step

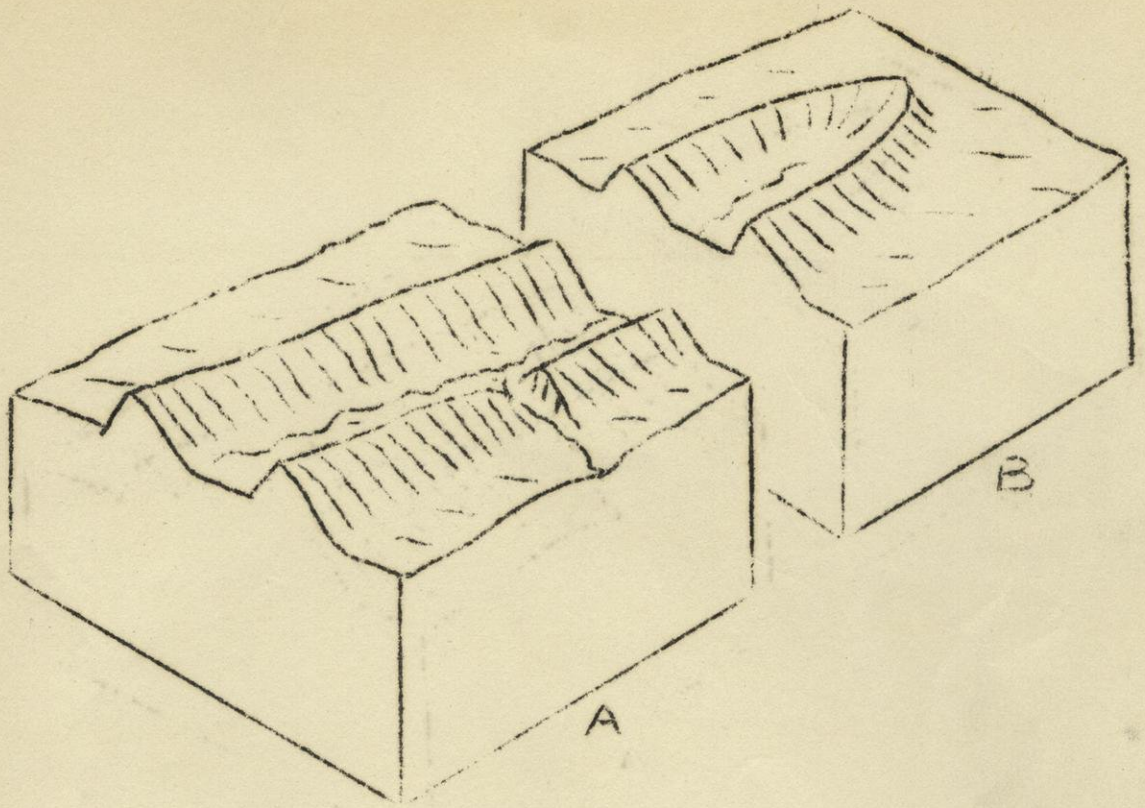
(8) Explain the nature, occurence, and origin of rock pediments

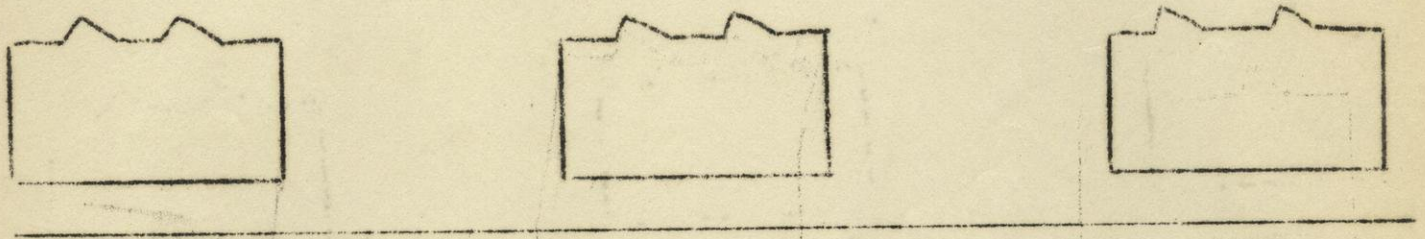
(9) Contrast two distinct theories of the origin of enclosed basins in western U. S.

(10) Where in western U. S. (be as specific as possible) would you find: (a) area of old alluvial fans now undergoing erosion, (b) large area of active sand dunes, (c) active volcano, (d) peneplain buried under lava flow, (e) large river following a course positively known to be antecedant

(11) Discuss the origin, topography, and subdivisions of the Great Valley of California

(1)





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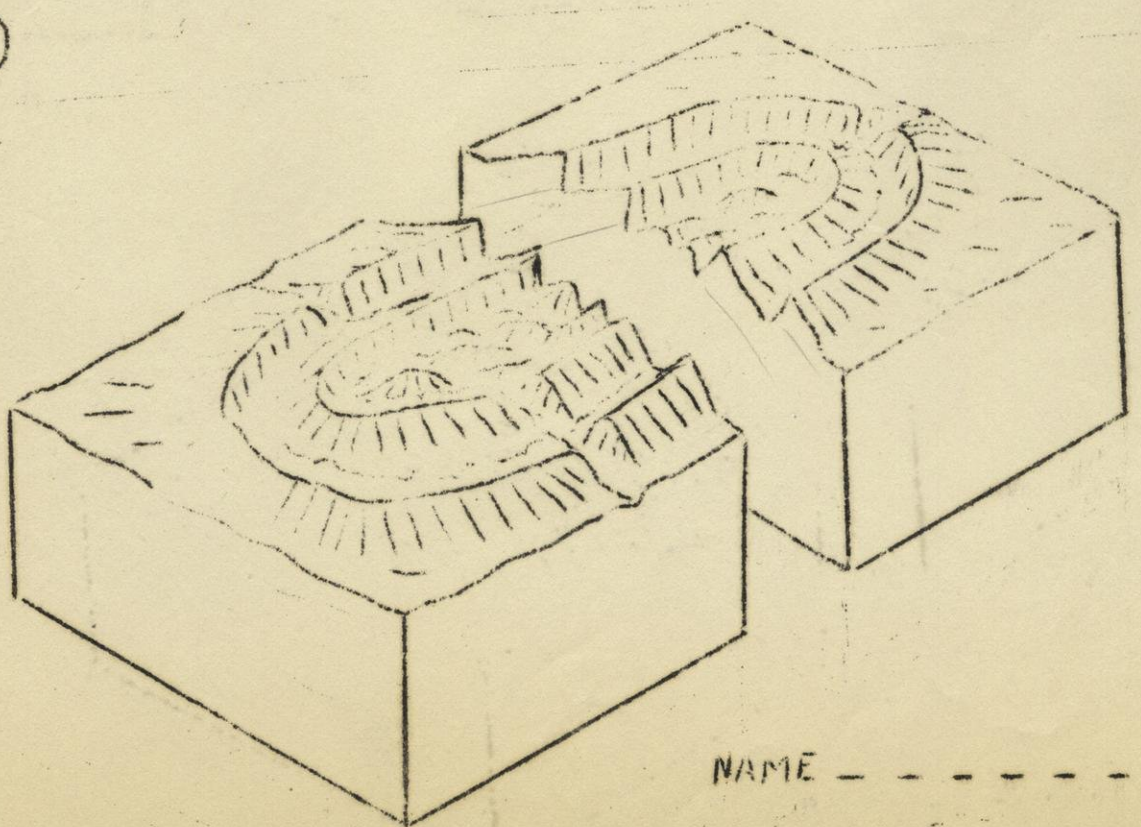

NAME _ _ _ _ _ _ _ _ _ _

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Readings for majors in geology and geography and for graduates.
Edition 1940-41.

Ozarks

Dake, C. L., Basal Pennsylvanian transgression in the Ozarks: Geol. Soc. America, Bull., vol. 46, pp. 697-714, 1935.

Ouachitas

Melton, F. A. and McGuire, F. H. The depth of the base of the Trinity sandstone and the present attitude of the Jurassic peneplain in southern Oklahoma and southwestern Arkansas: Am. Assoc. Pet. Geol., Bull., vol. 12, pp. 1005-1014, 1928.

Great Plains

Alden, W. C., Physiographic development of the Northern Great Plains: Geol. Soc. America, Bull, vol. 35, pp. 385-423, 1924.
Lugn, A. L., Nebraska in relation to the problems of Pleistocene stratigraphy: Am. Jour. Sci., vol. 237, pp. 851-884, 1939.

Southern Rockies

Atwood, W. W., Physiography and Quaternary geology of San Juan Mountains, Colorado: U. S. Geol. Survey, Prof. Paper, 166, pp. 11-31, 1932.
Van Tuyl, F. M., and Lovering, T. S., Physiographic development of the Front Range: Geol. Soc. America, Bull., vol. 46, pp. 1291-1350, 2046-2054, 1935.
Atwood, W. W. and Atwood, W. W. Jr., Working hypothesis for physiographic history of the Rocky Mountain region: Geol. Soc. America, Bull., vol. 49, pp. 957-980, 1938.

Middle Rockies

Mackin, J. H., Erosional history of the Big Horn Basin, Wyoming. Geol. Soc. America, Bull. vol. 48, pp. 813-894, 1937.
Bradley, W. H., Geomorphology of the south flank of the Uinta Mountains: U. S. Geol. Survey, Prof. Paper 185, pp. 167-199, 1936.
Eardly, A. J., Strong relief before block faulting in the vicinity of the Wasatch Mountains, Utah: Journ. Geology, vol. 41, pp. 243-267, 1933.

Northern Rockies

Daly, R. A., The accordance of summit levels among Alpine Mountains; Journ. Geology, vol. 13, pp. 110-125, 1905.
Umpleby, J. B., An old erosion surface in Idaho: Journ. Geology, vol. 20, pp. 139-147, 1912.
Blackwelder, Eliot, The old erosion surface in Idaho--a criticism: Journ. Geology, vol. 20, pp. 410-414, 1912.
Mansfield, G. R., Tertiary planation in Idaho: Journ. Geology, vol. 32, pp. 472-487, 1924.
Ross, C. P., Mansfield, G. R., and Anderson, A. L., Erosion surfaces in Idaho, discussion: Journ. Geol. vol. 38, pp. 643-651, 1930.
Pardee, J. T., Geology and water resources of Townsend Valley, Montana. U. S. Geol. Survey Water Supply Paper 539, pp. 38-44, 1925.

Columbia Plateau

Bretz, J. H., The Grand Coulee, pp. 3-20, 43-83, 1931; alternative hypotheses for channeled scablands: Journ. Geology, vol. 36, pp. 193-223, 312-341, 1928.
Flint, R. F., Origin of the Cheney-Palouse Scabland Tract, Washington: Geol. Soc. America, Bull., vol. 49, pp. 461-524, 1938.

Allison, I. S., New version of the Spokane flood: Geol. Soc. America, Bull., vol. 44, pp. 675-722, 1933.

Colorado Plateau

Fairchild, H. L., Origin of Meteor Crater, Arizona: Geol. Soc. America, Bull., vol. 18, pp. 493-504, 1907; Science, vol. 72, pp. 463-467, 1930.
Blackwelder, Eliot, The Age of Meteor Crater, Arizona: Science, vol. 76, pp. 557-560, 1932.
Gilbert, G. K., The Origin of Hypotheses - : Science, vol. 3, pp. 1-13, 1896.
Lobeck, A. K., Geomorphology, pp. 705-713, 1939.
Boutwell, W. D., The Mysterious Tombof a Giant Meteorite: Nat. Geogr. Mag., vol. 53, pp. 721-730, 1928.

Basin and Range

Longwell, C. R., Geology of Boulder Reservoir Floor: Geol. Soc. America, Bull., vol. 47, pp. 1470-1476, 1936; Geology of Muddy Mts., Nevada: U.S. Geol. Survey, Bull. 798, pp. 135-150, 1928.
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Johnson, Douglas, Rock Planes of Arid Regions: Geogr. Review, vol. 22, pp. 656-665, 1932.

Sierra-Cascade

Matthes, F. E., Geologic History of the Yosemite Valley: U.S. Geol. Survey Prof. Paper 160, pp. 22-54, 84-103, 1930.
Hodge, E. T., Geology of the Lower Columbia River: Geol. Soc. America, Bull., vol. 49, pp. 831-930, 1938.
Waters, A. C., Resurrected Erosion Surface in Central Washington: Geol. Soc. America, Bull., vol. 50, pp. 635-660, 1939.
Atwood, W. W., Jr., Crater Lake and Yosemite through the Ages: Nat. Geogr. Mag., vol. 71, pp. 327-343, 1937.

Pacific Border

Willis, Robin, Physiography of the California Coast Range: Geol. Soc. Am., Bull., vol. 36, pp. 641-678, 1925.
Barbat, W. F. and Galloway, John, San Joaquin clay, California: Am. Assoc. Pet. Geol., Bull., vol. 18, pp. 481-498, 1934.
Vickery, F. P., The interpretation of the physiography of the Los Angeles coastal belt: Am. Assoc. Pet. Geol., Bull., vol. 11, pp. 417-424, 1927: Consequent streams: Am. Assoc. Pet. Geol., Bull., vol. 12, pp. 515-526, 1928.

Geology 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Readings for majors in geology and geography and for graduates.
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Ouachitas

Melton, F. A. and McGuire, F. H. The depth of the base of the Trinity sandstone and the present attitude of the Jurassic peneplain in southern Oklahoma and southwestern Arkansas: Am. Assoc. Pet. Geol., Bull., vol. 12, pp.1005-1014, 1928.

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Lugn, A. L., The Pleistocene geology of Nebraska Nebraska Geol. Survey, Bull. 10, pp. 175-183, 1935.

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Joynson, Douglas, Rock Planes of Arid Regions: Geogr. Review, vol. 22, pp.656-665, 1932.

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Mathes, F. E., Geologic History of the Yosemite Valley: U.S. Geol. Survey Prof. Paper 160, pp.22-54, 84-103, 1930.
Hodge, E. T., Geology of the Lower Columbia River: Geol. Soc. America, Bull., vol. 49, pp.831-930, 1938.
Waters, A. C., Resurrected Erosion Surface in Central Washington: Geol. Soc. America, Bull., vol. 50, pp.635-660, 1939.
Atwood, W. W., Jr., Crater Lake and Yosemite through the Ages: Nat. Geogr. Mag., vol. 71, pp.327-343, 1937.

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Barbat, W. F. and Galloway, John, San Joaquin clay, California: Am. Assoc. Pet. Geol., Bull., vol. 18, pp. 481-498, 1934.
Vickery, F. P., The interpretation of the physiography of the Los Angeles coastal belt: Am. Assoc. Pet. Geol., Bull., vol. 11, pp. 417-424, 1927: Consequent streams: Am. Assoc. Pet. Geol., Bull., vol. 12, pp. 515-526, 1928.

GEOLOGY 139
PHYSIOGRAPHY OF WESTERN UNITED STATES

Questions on readings for majors in geology and geography and for graduates and on allied problems.

(1) Discuss two alternative ideas on origin of terraces slong rivers of Great Plains and foothills of Rockies
(2) What effect on interpretation of physiographic history of a mountain range has the interpretation of the smooth sloping uplands as pediments instead of peneplains?
(3) Discuss fully evidence for recent faulting along (a) west side of the Wasatch, (b) east side of Sierras
(4) Discuss alternative theories to account for the subequal elevations of mountain tops.
(5) Compare merits of the theories of Allison, Bretz, and Flint on origin of the Scablands
(6) Compare origin of Grand and Moses Coulees with that of scabland to the east.
(7) Discuss evidence advanced by Waters on the supposed Cascade Peneplain.
(8) Compare two distinct methods of glacial removal of bed rock including their results on mountain forms.
(9) Of what significance to topography is a study of (a) the sediments of Great Valley of California and (b) Tertiary deposits of Great Plains.
(10) Discuss evidences of recent faulting in Pacific Coast and Basin and Range provinces.
(11) Discuss Willis's ideas of physiography of California Coast Ranges
(12) Compare two theories of age relations of successive uplands in the western mountains, i.e. is highest oldest or youngest.
(13) What relation may pediments of Rockies have to glaciation?
(14) Discuss possible relation of continental Pleistocene of Nebraska to history of Great Plains and Rockies.
(15) Discuss validity of identification of the buried peneplaain under the Coastal Plain with the uplands of the Ouachitas and Ozarks.
(16) Discuss significance of the pre-Pennsylvanian surface of the Ozarks with respect to the present uplands and the Boston Mountains.
(17) What evidences seem to show the relatively recent coming of Colorado River in Basin and Range Province?
(18) How would continental glaciation affect the Basin and Range Province?
(19) Discuss validity of interpretain of summit levels or uplands in coastal mountains of western United Stated as dissected peneplains.
(20) What interpretation would now be placed on the gravel-covered foothills of the San Juan Mts.?
(21) List and account for six different kinds of plains found in a desert region.
(22) How does stream pattern indicate anticlinal structure in Los Angeles region?
(23) Discuss Hodge's idea of origin of Columbia River Gorge.
(24) List fully physiographic evidences of faults.
(25) Discuss question of peneplains vs marine terraces on Pacific Coast.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
100 Review Questions, 1937
Second Semester

These questions include many examination questions used in the past. Future examination questions may be drawn from or be similar to these questions.

1. Complete the following sentences; (a) The Rocky Mountain Front was once buried under Tertiary sediments because (b) The High Plains once extended much farther morth because (c) The High Plains once extended much farther east because (d) The top of the San Juan mountains is interpreted as a dissected peneplain because .
2. Account for the origin and present distribution of the High Plains.
3. Draw a generalized topographic and geologic cross section through the Black Hills.
4. Outline the steps in the physiographic history of the northern Great Plains.
5. Discuss the evidence for and against the presence of remnants of several peneplains in the Front Range of Colorado.
6. Outline with diagrams the physiographic history of the Ozark Plateau.
7. Outline with diagrams the history of the topography of the Southern Rockies.
8. Draw a topographic and geologic cross section of the Rocky Mountain Front in (a) Colorado, (b) Glacier National Park, (c) Saype quadrangle, Montana.
9. Explain with diagrams four (4) possible structural explanations of the hogbacks with strata dipping toward the mountains which are found in Montana.
10. Explain the controversy over (a) the existance of a peneplain during the history of Northern Rockies, (b) efforts to date this surface.
11. Explain why the Great Plains are separated from the Interior Lowland and discuss the boundary line.
12. Explain with diagrams the history of the topography of the San Juan Mountains of Colorado.
13. Illustrate by diagrams: (a) effect on topography of an overturned fold in which great differences in resistance of strata are present, (b) why hogbacks are present only along certain parts of the Rocky Mountain Front. Give examples of both.
14. Explain the history and origin of the basin of Yellowstone Lake.
15. Explain with diagrams two different possible histories of the Teton Range, Wyoming.
16. Complete the following sentences (a) The plateau topography of western Northern Rockies is due to (b) The Rocky Mountain front is an erosional and not a constructional feature because (c) The Snake River Plain is level because (d) The Tertiary Basins of Northern Rockies are constructional in origin because (e) The mountains of Glacier National Park are more scenic than the Columbia Range because
17. Describe the "scablends" and explain the controversy over their origin.
18. Explain fully the differences in origin and topography of peneplains and pediments.
19. Explain with diagrams the physiographic history of the Missouri Plateau.
20. Account for (a) Boston Mts. (b) Springfield Platform (c) St. Francis Mts. (d) Goshen Hole (e) Edwards Plateau. Use diagrams where needed.
21. Outline with diagrams the physiographic history of the Colorado Piedmont and Pecos Valley.

22. Discuss the geology, structure and topography of the Parks of Colorado including San Luis Valley.
23. Account for: (a) Devils Tower (b) Pine Ridge (c) Raton Mesa (d) Race Track (e) Smoky Hills.
24. Outline reasons for subdividing and list the subdivisions of the (a) Great Plains, (b) Rocky Mts., (c) Columbia Plateau, (d) Basin and Range province.
25. Explain the conditions requisite for the formation of badlands and locate two important areas in Great Plains.
26. Account for the drainage of the Wyoming Basin and give examples.
27. Discuss the origin and topography of the Yellowstone Plateau including its scenic features.
28. Describe and account for two different kinds of escarpments in the Colorado Plateau.
29. Outline the physiographic history of the Unita Mts. using latest interpretation.
30. Compare the topography of the northern and southern Rockies and account for the differences.
31. Account for relation of Columbia Plateau lavas to Northern Rockies including interpretation of Tertiary Basins.
32. Complete the following sentences (a) The Grand Canyon of the Colorado was formed in a different cycle of erosion than the escarpments of the high Plateau because
(b) This mountain range is bounded by a fault because - (two reasons).
(c) The Colorado Plateau is differentiated from the Basin and Range Province because -
(d) The Henry Mts. as known to be - because
(e) Because lava of the same kind occurs both on the valley floor and the top of the mountain adjacent we must conclude that -
33. Explain the origin of the Columbia Plateau before erosion.
34. Account for the drainage of the Columbia Plateau considering two hypotheses.
35. Explain the relation of the Ouichitas to the Arbuckles, Appalachians, Llano District, and Coastal Plain.
36. Account for three distinct types of mountains in the Colorado Plateau.
37. Outline the physiographic history of the Ouichita Mountains using diagrams.
38. Discuss the geologic history of the Lower Colorado River and its significance on history of Basin-Range Province.
39. Discuss the "Basin Range Problem".
40. Outline with diagrams the physiographic history of the southern Great Plains.
41. Outline with diagrams the physiographic history of the Columbia Plateau and its included mountains.
42. Outline with diagrams the physiographic history of the Edwards Plateau and adjacent region to the north.
43. Outline with diagrams the physiographic history of the Llano District, Texas.
44. What other stream may have had the same history as the Colorado River as now interpreted?
45. Discuss bearing of new interpretation of Lower Colorado River on history of Colorado Plateau.
46. Discuss two distinct theories of the origin of Crater Mound or Coon Butte, Arizona.

47. Discuss two distinct explanations of the origin of the enclosed basins of the Basin and Range province.
48. Discuss the importance of wind work in the Basin and Range province.
49. Explain the "Second Cycle Theory" of the origin of Basin and Range topography.
50. What physiographic evidences tell of geologically recent climatic changes in the Basin and Range province? Discuss also an alternative hypothesis.
51. Locate and describe several examples of lascolitic mountains in varying stages of erosion.
52. Discuss two distinct explanations of the relation of the present drainage to rock structure in the Colorado Plateau.
53. Discuss two distinct explanations of the benches within the Grand Canyon of the Colorado.
54. Outline with diagrams the stops in the physiographic history of the Sierra Nevada.
55. Outline with diagrams the physiographic history of the northern and central Cascades.
56. Explain the physiographic history of the Puget Sound district.
57. Discuss two distinct explanations of the history of Crater Lake, Oregon.
58. Account for (a) Missouri Cotean (b) Llano Estacado (c) Mt. Shasta (d) Dominguez Hill (e) Break of the Plains.
59. Contrast volcanic phenomena of Cascades with those of Columbia Plateau.
60. List physiographic evidences of faulting.
61. Locate as definitely as possible outstanding examples of sand dunes, triangular facet, recent volcano, cirque, arete, and other land forms.
62. Outline with diagrams the physiographic history of Yosemite Valley.
63. Discuss two distinct explanations of the present course of Rio Grande River.
64. Draw a topographic and geologic cross section through the High Plateaus of Utah naming the several cliffs.
65. Demonstrate to a doubter that the Grand Canyon of the Colorado is the product of removal of material rather than depression of the ground.
66. Draw a cross section of the Grand Canyon and explain the principal features in their relation to the geology.
67. Discuss the boundary between the Columbia plateau and the Basin and Range province.
68. Discuss evidences for and against peneplaination of the Cascades.
69. What physiographic evidences indicate recent changes of level on the Pacific Coast? Explain fully.
70. Explain the phsiographic history of the Yakima District, Washington.
71. Give two possible explanations of the drowned river mouths of the Pacific Coast.
72. Discuss two explanations of the course of Columbia River across the Cascades.
73. Explain the origin of the Coastal Plain of Oregon and Washington.
74. Discuss the problem of correlation of peneplains in the California Coast Ranges.
75. What evidences indicate that mountain building is still in progress on the Pacific Coast?
76. Summarize the physiographic history of the Los Angeles Basin.
77. Summarize the features of the Lower California division; with what district to the north might it be correlated?
78. What physiographic evidences disclose anticlinal structures in (a) foothills of the Rockies, (b) Los Angeles Basin.
79. Discuss evidences of the supposed peneplains of the Sierra Nevada.
80. Summarize the nature of the Sacramento Section of the Basin and Range.

81. What topographic changes would affect the Basin and Range province where climate to become humid and remain so for many thousands of years.
82. Explain the origin of the coulees of the Columbia Plateau.
83. Discuss topography and physiographic history of (a) Klamath Mts. (b) Oregon coast range.
84. Summarize physiographic history of the Great Valley of California.
85. Account for the fact that some volcanic eruptions in western United States resulted in peaks and others in plains.
86. Contrast the evidence for peneplaination in (a) northern Cascades and (b) Oregon Coast Range.
87. How are hanging valleys produced? Give definite examples of each class in western United States.
88. What has been the effect of continental glaciation on the topography of the Great Plains? Explain fully including drainage changes.
89. What topographic forms due directly or indirectly to vulcanism are found in the Great Plains? Locate examples of each.
90. Account for (a) Absoraka Range (b) Marysville Buttes (c) San Francisco Plateau (d) Golden Gate (e) Lake Missoula.
91. What physiographic evidences demonstrate that all the displacement on a given fault is not accomplished at one time?
92. Explain physiographic history of Imperial Valley, California.
93. What evidences indicate that the through streams of the High Plains are aggrading their beds? What indicate the contrary? Discuss.
94. Complete the following: (a) The Rocky Mountain Front was once completely buried under alluvial fans because (b) The Ouachita Mountains were once buried by the coastal Plain sediments because (c) The Ozark Plateau was recently uplifted because (d) The San Juan Mountains were uplifted several times during glaciation because (e) The Mountains of the Sonoran Desert are older than those of the Great Basin because
95. How can you distinguish between a fault scarp and fault line scarp?
96. Account for three distinct types of mountains which rise above the general level of the Columbia Plateau and are surrounded by lavas.
97. Account for the shore outline of Puget Sound.
98. Discuss the different methods of origin of triangular facets or truncated spurs and locate examples in western United States.
99. Discuss the topography and history of the California Coast Range.
100. Explain and discuss two distinct hypotheses of the origin of the Canyon of Green River in Uinta Mountains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
100 Review Questions, 1932
Second Semester

These questions include many examination questions used in the past. Future examination questions may be drawn from or be similar to these questions.

1. Draw a topographic and geologic cross section from where Red River crosses the west line of Arkansas northeast through the St. Francis Mts. to Mississippi River.
2. Account for the origin and present distribution of the High Plains.
3. Draw a generalized topographic and geologic cross section through the Black Hills.
4. Outline the steps in the physiographic history of the northern Great Plains.
5. Discuss the field evidence which leads to the conclusion that there have been not less than two cycles of erosion in Idaho during the Tertiary Period.
6. Discuss the evidence which can be used to attach geologic dates to the Idaho peneplains. (Use diagrams.)
7. Outline with diagrams the history of the topography of the Southern Rockies.
8. Draw a topographic and geologic cross section of the Rocky Mountain Front in (a) Colorado, (b) Glacier National Park, (c) Saypo quadrangle, Montana.
9. Explain with diagrams four (4) possible structural explanations of the hogbacks with strata dipping toward the mountains which are found in the Saypo quadrangle, Montana.
10. What two causes may have accounted for the alternate aggradation and degradation of the Great Plains?
11. Explain why the Great Plains are separated from the Interior Lowland and discuss this boundary line.
12. Explain with diagrams the history of the topography of the San Juan Mountains of Colorado.
13. Illustrate by diagrams: (a) effect on topography of an overturned fold in which great differences in resistance of strata are present, (b) why hogbacks are present only along certain parts of the Rocky Mountain Front. Give examples of both of above locating as definitely as possible.
14. Explain the history and origin of the basin of Yellowstone Lake.
15. Explain with diagrams two different possible histories of the Teton Range, Wyoming.
16. Give very briefly the essential facts about the major topographic features, including their origin, which a traveller might see going in a nearly straight line from Cheyenne, Wyoming to Salt Lake City, Utah; from Salt Lake City to San Francisco; from Sheridan, Wyoming to Walla Walla, Washington; from Walla Walla to Seattle.
17. Same as above question for (a) Dallas, Texas to Tucson, Arizona; (b) Tucson to San Diego, California, (c) San Antonio, Texas north through Black Hills to Canadian border; (d) Colorado Springs, Colorado to Los Angeles, California
18. Where in Western U. S. could you find one example, located as definitely as possible, of sand dunes, ridges due to overturned folds, young lava plain, exhumed pre-Cambrian peneplain forming present surface, Dakota hogback, young volcanic cone, active volcano, moderately dissected lava flows not mountains, erosional escarpment in nearly horizontal strata, fault scarp, fault line scarp, dissected alluvial plain, young alluvial plain, cirque, matterhorn, arete, exhumed Pennsylvanian peneplain, bolson, playa, basin enclosed by delta, structural basin extending below sea level, three-story valley, rock step, granite dome, abandoned waterfall, block mountain, flatiron, exhumed pre-Cambrian monadnock, sand dunes over large area, loess plains, uneroded lake plain, cirque in approximately horizontal strata, triangular facet, laccolithic mountain, dome mountain, peneplain remnant preserved under lava flow, abandoned lake bed caldera, meteor crater, canyon due to spring sapping, valley due to glacial st. diversion (temporary), river valley due to glacially diverted stream, glacial l basin, superimposed stream, antecedant stream, stream diversion due to lava flo
19. Explain briefly the uni que topographic features and their origin which ser to make Glacier National Park attractive to visitors.

20. Explain geologic reasons for the fact that the Grand Canyon of the Colorado is so much more popular with visitors than are other large canyons of the West.
21. Outline with diagrams the physiographic history of the Colorado Piedmont.
22. Explain briefly with diagrams the origin and geologic structure of Boston mts., Goshen Hole, San Juan Mts, Col., North Park, Break of the Plains, Pine Ridge escarpment, Colorado Piedmont, High Plains, Edwards Plateau, Coteau du Missouri, Sand Hill district of Nebraska, tepee buttes, Llano district, San Luis Valley, Needle Mts, Col., Absoraka Mts, Beartooth Mts, Yellowstone Plateau, Wasatch Mts., Bitterroot Mts, Lewis Range, Blue Mts, Oregon, Sierra Nevada, Coast Range of Oregon, Cascade Mts. including a volcanic peak, a typical Basin Range, range in Sonoran Desert, Great Valley of California, Puget Sound region, Olympic Mts., coast of Oregon, Yosemete Valley, Crater Lake, Southern Cascades, Grand Canyon at Kaibab Plateau, Marble Gorge, Grand Canyon with Esplinade, San Francisco Mts., Zuni Mts., Crater Mound, The Solatario, Chuska Mts., border between Basin and Range and Colorado Plateau north of Colorado River, same south of Colorado River in Arizona.
23. Where and what are (be brief): Springfield platform, Wichita Mts., Arbuckles, Devils Tower, West Elk Mts., Red Hills, Gros Ventre Range, Callahan Divide, Needles Mts., San Francisco Mts., Royal Gorge, Rabbit Ears Mts., Little Rocky Mts., Race Track, Front Range, San Juan Mts., Salem Platform, Pine Ridge Escarpment, Raton mesas, Cypress Hills, Smoky Hills, Owyhee Mts., Park Plateau, Las Vegas Plateau, Pecos valley, Comanche Plateau, Llano Estacado, Big Snowy Mts., Crazy Mts., Sawatch Range, White River Plateau, Axial Basin, Carbon Basin, Great Divide Basin, Purcell Tronch, Flathead Lake, Craters of the Moon, Thousand Springs, Deer Lodge valley, High Sierra, Mt. Shasta, Mt. Whitney, Owens Lake, Lake Tahoe, Puget Sound, Coos Bay, Yosemete Valley, Hurricane Ledge, San Bernardino Range, Lake Tulare, Marysville Buttes, Klamath Mts., Mt. Stuart, Tularosa Basin, Scablands, Kaibab Plateau, Aquarius Plateau, Lake Lahontan, Lake Bonneville.
24. Outline reasons for subdividing and list the subdivisions of the (a) Great Plains, (b) Rocky Mts., (c) Columbia Plateau, (d) Basin and Range province.
25. Explain the conditions requisite for the formation of badlands and locate two important areas in Great Plains.
26. Account for the drainage of the Wyoming Basin. Give examples.
27. Discuss the origin and topography of the Yellowstone Plateau including its scenic features.
28. Discuss the effect of mountain glaciation on scenic features and contrast with effect of continental glaciation of mountains.
29. Outline the physiographic history of the Unita Mts.
30. Compare the topography of the northern and southern Rockies and account for the differences.
31. Discuss the controversy over the Tertiary Basins of Idaho and Montana.
32. What effect do the rocks of the Columbia Plateau have on its scenic features?
33. Explain the origin of the Columbia Plateau before erosion.
34. Account for the drainage of the Columbia Plateau considering two hypotheses.
35. Explain the relation of the Ouachitas to the Arbuckles, Appalachians, Llano District, and Coastal Plain.
36. Discuss the extensions of the Arbuckle Mountains.
37. Outline the physiographic history of the Ouachita Mountans using diagrams.
38. Outline with diagrams the physiograpic history of the Wichita Mountains.
39. Outline with diagrams the physiographic history of the Ozark Plateau.
40. Outline with diagrams the physiographic history of the southern Great Plains.
41. Outline with diagrams the physiographic history of the Columbia Plateau and its included mountains.
42. Outline with diagrams the physiographic history of the Edwards Plateau and adjacent region to the north.
43. Outline with diagrams the physiographic history of the Llano District, T
44. Discuss the method used in determining the geologic ages of the peneplain of the Southern Rockies.
45. Discuss evidences of mountain glaciers in the western mountains, including their distribution and the reason for concluding that serveral distinct glaciations have taken place.

46. Discuss two distinct theories of the origin of Crater Mound or Coon Butte, Arizona
47. Discuss two distinct explanations of the origin of the enclosed basins of the Basin and Range province.
48. Discuss the importance of wind work in the Basin and Range province.
49. Explain the "Second Cycle Theory" of the origin of Basin and Range topography.
50. What physiographic evidences tell of geologically recent climatic changes in the Basin and Range province? Discuss also an alternative hypothesis.
51. Discuss two distinct explanations of the origin of the mountains of the Basin and Range province.
52. Discuss two distinct explanations of the relation of the present drainage to rock structure in the Colorado Plateau.
53. Discuss two distinct explanations of the benches within the Grand Canyon of the Colorado.
54. Outline with diagrams the steps in the physiographic history of the Sierra Nevada.
55. Outline with diagrams the physiographic history of the northern and central Cascades.
56. Explain the physiographic history of the Puget Sound district.
57. Discuss two distinct explanations of the history of Crater Lake, Oregon.
58. Describe and illustrate with cross sections two different kinds of boundary between the Colorado Plateau and the Basin and Range province.
59. Explain the origin of mountain pediments in Basin and Range province.
60. List physiographic evidences of faulting.
61. How may alluvial fans be distinguished from pediments?
62. Outline with diagrams the physiographic history of Yosemite Valley.
63. Discuss two distinct explanations of the present course of Rio Grande River.
64. Draw a topographic and geologic cross section through the High Plateaus of Utah naming the several cliffs.
65. Demonstrate to a doubter that the Grand Canyon of the Colorado is the product of removal of material rather than depression of the ground.
66. Draw a cross section of the Grand Canyon and explain the principal features in their relation to the geology.
67. Discuss the boundary between the Columbia plateau and the Basin and Range province.
68. Discuss evidences for and against the peneplanation of the Cascades.
69. What physiographic evidences indicate recent changes of level on the Pacific Coast? Explain fully.
70. Explain the physiographic history of the Yakima District, Washington.
71. Discuss the nature and origin of the Scablands.
72. Outline with diagrams the physiographic history of the Arbuckle Mountains.
73. Explain the origin of the Coastal Plain of Oregon and Washington.
74. Discuss the problem of correlation of peneplains in the California Coast Ranges.
75. What evidences indicate that mountain building may still be in progress on the Pacific Coast?
76. Summarize the physiographic history of the Los Angeles Basin.
77. Summarize the features of the Lower California division; with what distr to the north might it be correlated?
78. What physiographic evidences disclose anticlinal structures in (a) foothi of the Rockies, (b) Los Angeles Basin.
79. Discuss evidences of the supposed peneplains of the Sierra Nevada.
80. Summarize the nature of the Sacramento Section of the Basin and Range
81. What topographic changes would affect the Basin and Range province we climate to become humid and remain so for many thousands of years.
82. Explain the origin of the couleos of the Columbia Plateau.
83. Explain why in some mountain ranges the adjustment of drainage to rock character and structure is closer than it is in others.

84. Summarize physiographic history of the Great Valley of California.
85. Account for the fact that some volcanic eruptions in western United States resulted in peaks and others in plains.
86. What is the physiographic significance of a row of hot springs? Explain fully.
87. How are hanging valleys produced? Give definite examples of each class in western United States.
88. What has been the effect of continental glaciation on the topography of the Great Plains? Explain fully including drainage changes.
89. What topographic forms due directly or indirectly to vulcanism are found in the Great Plains? Locate examples of each.
90. Describe the physiographic features taken advantage of in building the railroad from Cheyenne, Wyoming to Reno, Nevada.
91. What physiographic evidences demonstrate that all the displacement on a given fault is not accomplished at one time?
92. Have the Rockies been elevated above the Great Plains in relatively recent time? Discuss fully.
93. What evidences indicate that the through streams of the High Plains are aggrading their beds? What indicate the contrary? Discuss.
94. What evidences in the field indicate more than one cycle of erosion in the development of the present topography of the Colorado Plateau.
95. How could you distinguish between a fault scarp and a fault line scarp? Use diagrams and locate definite examples of each in western U. S.
96. Account for three distinct types of mountains which rise above the general level of the Columbia Plateau and are surrounded by lavas.
97. Account for the shore outline of Puget Sound.
98. Discuss the different methods of origin of triangular facets or truncated spurs and locate examples in western United States.
99. Discuss the topography and origin of the Raton Mesas
100. Explain and discuss two distinct hypotheses of the origin of the Canyon of Ladore in Uinta Mountains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
100 Review questions, second semester

1. Draw a topographic and geologic cross section from where Red River crosses the west line of Arkansas northeast through the St. Francis Mts. to the Mississippi
2. Account for the origin and present distibution of the High Plains
3. Where and what are (give physiographic significance of each): (a) Devils Tower, (b) Goshen Hole, (c) Pine Ridge escarpment, (d) Edwards Plateau, (e) Raton mesas
4. Where and what are (a) Balcones escarpment, (b) Colorado Piedmont, (c) Break of the Plains, (d) Boston Mts., (e) Springfield Platform, (f) Salem Platform
5. Draw a geologic and topographic cross section of the Black Hills labeling all principal features
6. Discuss in outline form the physiographic history of the northern Great Plains
7. Discuss the field evidence which leads to the conclusion that there have been not less than two cycles of erosion in Idaho during the Tertiary Period including the evidences which have been used to date the times of completion of these cycles
8. Outline with diagrams having explations with them the history of the topography of the Southern Rockies and adjacent Great Plains since the uplift of the Cretaceous strata
9. Where and what are: (a) Front Range, (b) San Juan Mts., (c) North Park, (d) Rocky Mountain Peneplain, (e) Pikes Peak
10. Where and what are: (a) Garden of the Gods, (b) Ute Pass, (c) Golden Mesas, (d) San Luis Valley, (e) Shaws Park, (f) Low Park
11. Draw two cross sections showing the geology and topography of the Rocky Mountain Front in (a) Colorado and (b) Glacier National Park
12. What physiographic reason makes the Moffat Tunnel an important route between Denver and the west?
13. What two causes may have accounted for the alternate aggradation and degradation of the Great Plains? Use diagrams
14. Give at least two distinct reasons for dividing the Great Plains from the Interior Lowlands and the Coastal Plain and include a discussion of the eastern boundary of the Great Plains
15. Explain several important differences in topography and rock structure between the average mountain range of the Basin and Range province and a range in the Southern Rockies
16. Name, locate, and account for four different types of mountains within the area of the Colorado Plateau
17. Account for two different types of escarpments between plateaus of the Colorado Plateau and tell how they may be distinguished both on map and in the field
18. Discuss two separate theories of the origin of Coon Butte or Meteor Mt., Arizona
19. Draw a cross section of the Grand Canyon of the Colorado showing and naming the rock formations and account for the relation between rock character and topography
20. Do the same as above for the High Plateaus of Utah
21. Explain and tell where the following may be found in Colorado Plateau or Great Basin: (a) Fault scarp, (b) triangular facet, (c) alluvial fan, (d) bolson, (e) hanging valley due to other causes than glaciation
22. Explain and tell where each may be found in Colorado Plateau or Basin and Range Province: (a) salt lake, (b) fresh lake, (c) volcanic cone, (d) block mountain, (e) monocline,
23. Explain and tell where each may be found in Colorado Plateau or Basin and Range Province: (a) peneplain under lava flow, (b) laccolithic mountains, (c) dome mountain, (d) anticlinal valley, (e) erosional escarpment in horizontal beds
24. Where and what are: (a) San Raphael Swell, (b) Vermilion Cliffs, (c) Zuni Mts., (d) San Francisco Mts., Arizona, (e) Kaibab Plateau
25. Where and what are: (a) Bright Angle Creek, (b) Wasatch Mts., (c) Zuni salt

Lake, (d) Najo Mt., (e) Zilh-le-jini Mesa
26. Where and what are: (a) Chuska Mts., (b) Dolores Plateau, (c) Henry Mts., (d) Marble Canyon, (e) Uinta Mts.
27. Name in the western U. S. (a) two widely separated regions of sand dunes, (b) two rugged mountain ranges consisting of approximately horizontal sediments
28. Locate in western U. S. several mountain ranges which show strongly marked features due to local glaciation
29. Locate in western U. S. (a) three separate localities where alluvial fans are being formed and (b) two areas where there has certainly been vulcanism in postglacial time
30. Locate in western U. S. a place where old alluvial fans are now being removed because of change in climate
31. Compare the Columbia and Colorado Plateaus as to structure, bed rocks, stage in the erosion cycle, and general physiographic history
32. Compare the Black Hills with the Central Denuded Region (Central Mineral Region) of Texas as to topography and physiographic history
33. Explain the structure and origin by means of cross sections of : (a) Puget Sound, (b) Wasatch Mt., (c) Crater Lake, (d) Grand Coulee, (e) Valley of California
34. Draw a cross section from the crest of the Colorado Mts. near Denver east to central Wisconsin and show (a) pre-Cambrian peneplane, (b) High Plains, (c) Colorado Piedmont, (d) Break of the Plains, (e) Osage Plains, (f) border of glaciated area, (g) borders of Driftless Area, (h) border of Young Drift, (i) Low Plains, (j) Rocky Mt. Peneplane with monadnocks
35. Discuss the evidences which show that the mountain ranges of the Basin and Range Province are mainly due to block faulting
36. Discuss the physiographic history of the Grand Canyon region using diagrams
37. Illustrate the physiographic history of the Great Basin with diagrams. Begin with completion of folding
38. Discuss the physiographic history of Crater Lake, Oregon using diagrams
39. Outline the physiographic history of Yosemite Valley, California, using diagrams
40. Discuss the history and explations of origin of Lake Bonneville
41. What field evidences are there of relatively recent uplift and depression of the land along the Pacific coast?
42. Draw a cross section of the Sierra Nevada Mountains to illustrate their origin and explain their physiographic history
43. Discuss evidence of former peneplaination of the Cascade Mountains
44. Discuss the origin and nature of the Great Valley of California
45. Where and what are: (a) Grand Coulee, (b) Moses Lake, (c) "The Potholes", (d) Mount Rainier, (e) Klamath Lake
46. Where and what are: (a) Lake Tahoe, (b) Death Valley, (c) Lake Lahontan, (d) Carson Sink, (e) Hurricane Ledge
47. Explain the topgraphic changes due to mountain glaciation
48. Account for the differences in the lower limit of glacial cirques in different western mountain ranges
49. How may the difference between glacial deposits in a mountain valley and landslide deposits be determined?
50. Explain two hypotheses of the origin of the Canyon of Ladore
51. Explain the course of Missouri River in its relation to preglacial drainage
52. Discuss the evidences for and against the explanation of the uplands of the Ozark region as dissected peneplains
53. What is the relation between the Ouachitas and the Folded Appalachians?
54. What differences in rock structure between the Ouachitas and the Folded Appalachians?
55. How do overturned folds affect the interpretation of structure from (a) ridges on flanks of folds, and (b) noses of folds? Use diagrams

56. Account for the Colorado Piedmont and state where other similar features occur
57. Account for (a) Chief Mt., (b) Highwood Mts., (c) Little Rocky Mts., (d) Cypress Hills, (e) Coteau du Missouri Use diagrams
58. Account for three distinct types of elevations which rise above the general level of the Columbia Plateau but which are entirely surrounded by lavas
59. Discuss the nature and origin of the "Scablands"
60. Explain the origin and give location of examples of (a) flatrions, (b) hog-backs, (c) incised meanders, (d) geysers, (e)playas
61. Account for the shore outline of Puget Sound
62. Draw a cross section from the Olympic Mts. east to the Great Plains showing structure and physiographic features
63. Where and what are: (a) Marysville Buttes, (b) Malheur Lake, (c) Payette Lake, (d) Blue Mts. of Oregon, (e) The [illegible] Red Valley
64. Where and what are: (a) Tulare Lake, (b) Los Angeles Basin, (c) Santa Lucia Range, (e) Klamath Mts.
65. Illustrate by a sketch the relation of the two ancient peneplains of western Idaho to the Columbia Plateau
66. Account for the fact that some volcanic eruptions in the western U. S. resulted in peaks and others in plains; give illustrations of each
67. Outline the physiographic history of the Cascades using cross sections
68. Outline the physiographic history of the Columbia Plateau using cross sections
69. Draw a series of block diagrams to illustrate progress of erosion along a fault scarp
70. Can triagular facets be formed otherwise than by faulting? Explain and tell how distinguished.
71. Locate and d escribe the coastal plain of the Pacific coast
72. What and where are: (a) Olympic Mts., (b) Rift Valley, (c) Klamath River, (d) Willamette Valley, (e) Pitt Valley
73. Discuss evidence for and against peneplanation in the Coast Ranges of Oregon
74. What is the physiographic significance of a line of hot springs?
75. Describe the origin and drainage history of Yellowstone Lake and the Grand Canyon of the Yellowstone.
76. Discuss the origin of the soils of the Columbia Plateau
77. What is ment by "Basin Range structure"?
78. Discuss the physiographic evidences of dome structure and give examples in western U. S.
79. What physiographic evidence demonstrates that movement on faults seldom takes place all at one time
80. Discuss two hypotheses to account for the course of Colorado River
81. State the evidence of past climatic changes in the Basin and Range Province giving their relation to glaciation
82. What has been the effect of continental glaciation on the topography of the Great Plains?
83. What has been the effect of vulcanism on the topography of the Great Plains?
84. What has been the effect of mountain glaciation on the topography of the Great Plains?
85. Describe the process of formation of the gravel slopes at the base of many mountain ranges of the western U. S.
86. Why is the Ozark structural dome not like the Nashville Basin?
87. Explain the physiographic history of the Imperial Valley, California
88. Account for: (a) Mt. Shasta., (b) Llano Estacado, (c) Absoraka Range, (d) Bitterroot Mts., (e) Rocky Mt. Trench Locate each
89. Account for the formation of "Bad Lands" and locate examples
90. Discuss two different types of present day streams found in the Great Plains
91. Discuss the origin and significance of the Lampasas Plain and Edwards Plateau
92. Discuss origin of: (a) Little Belt Mt., (b) Highwood Mts., (c) San Bernardino Mts., (d) St. Francis Mts., (e) Arbuckle Mts.

10 X

93. Discuss the differences in structure and topography of the Southern Rockies and the Folded Appalachians of Pennsylvania
94. Where and what are: (a) Great Falls Lake, (b) Shonkin Sag, (c) Sweetgrass Hills, (d) Pecos Valley, (e) Callahan Divide
95. Describe the physiographic features along the route of the Union Pacific-Central Pacific route from the east side of the Rockies to San Francisco, pointing out those which favored the early construction of the railroad
96. What physiographic feature seems most to have aided the construction of railroads and highways through the Northern Rockies? Explain its origin and features
97. Give localities and evidence of volcanic eruptions in the western U. S. within historic times
98. What conditions in a bolson favor the development of artesian wells? Same for the Columbia Plateau, Great Valley of California, and Los Angeles Basin
99. Explain why some western lakes are salt and others fresh
100. (a) Explain why some investigators concluded that the thickness of gravel in a bolson is slight. (b) Explain why this gravel differs from the kind of gravel found in Wisconsin

1931

Examination questions will be drawn from or be similar to these questions.

"30"

Geology 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Calendar, 2nd Semester, 1940-41

Text for first two weeks--Fenneman, Physiography of Eastern United States; afterwards Fenneman, Physiography of Western United States. New students need not purchase the former book. Special readings for majors in geology and geography and for graduates on another list.

Feb.	10	Organization
	12	Ozarks 631-647
	14	647-662
	17	Ouachitas 663-676
	19	676-689
	21	Great Plains 1-16
	24	16-37
	26	37-50
	28	50-69
Mar.	3	69-91
	5	Southern Rockies 92-117
	7	117-132
	10	Exam--room to be announced
	12	Wyoming Basin 133-149
	14	Middle Rockies 150-165
	17	166-182
	19	Northern Rockies 183-197
	21	197-211
	24	Discussion; 211-224
	26	Columbia Plateau 225-237
	28	238-251
	31	251-264
Apr.	2	264-273
	4	Discussion
	7	Exam
	9	Colorado Plateau 274-291
	11	291-306
	14	306-325
	16	Discussion
	18	Basin and Range 326-340
	28	340-355
	30	355-373
May	2	373-390
	5	390-395
	7	Discussion
	9	Exam
	12	Sierra-Cascade 396-409
	14	409-427
	16	427-441
	19	Pacific Border 442-458
	21	458-471
	23	472-486
	26	486-500
	28	500-510
June	2	Review
	4	Review
	6	Review
	16	Final Exam 8 A. M. room to be announced

Laboratory reports due (no extensions unless arranged for in advance:) Ozarks Feb. 19, Ouachitas Feb. 26, Great Plains Mar. 12, Southern Rockies Mar. 26, Wyoming Basin and Middle Rockies Apr. 2, Northern Rockies Apr. 16, Columbia Plateau Apr. 30, Colorado Plateau May 7, Basin and Range May 21, Sierra-Cascade June 4, Pacific Border and map June 13.

Those taking 5 credits will be assigned to 4 hours per week laboratory work. Regular hours are T-Th 8-10, 9-11, or 1:30-3:20; M-W 9-11.

Geology 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Calendar, 2nd Semester, 1939-40

Text for first two weeks--Fenneman, Physiography of Eastern United States; afterwards Fenneman, Physiography of Western United States. New students need not purchase the former book. Special readings for majors in geology and geography and for graduates on another sheet.

Feb.	5	Organization	Apr.	1	Exam
	7	Ozarks 631-647		3	Colorado Plateau 274-291
	9	647-662		5	291-306
	12	Ouachitas 663-676		8	306-323
	14	676-689		10	Discussion
	16	Great Plains 1-16		12	Basin and Range 326-340
	19	16-37		22	340-355
	21	37-50		24	355-373
	23	50-69		26	373-390
	26	69-91		29	390-395
	28	Southern Rockies 92-117	May	1	Discussion
Mar.	1	117-132		3	Exam
	4	Exam--room to be announced		6	Sierra-Cascade 396-409
	6	Wyoming Basin 133-149		8	409-427
	8	Middle Rockies 150-165		10	427-441
	11	166-182		13	Pacific Border 442-458
	13	Northern Rockies 183-197		15	458-471
	15	197-211		17	472-486
	18	Discussion 211-224		20	486-500
	20	Columbia Plateau 225-237		22	500-510
	22	238-251		24	Review
	25	251-264		27	Review
	27	264-273		29	Review
	29	Discussion		31	Review
			June	11	Final Exam 8 A.M. room to be announced

Laboratory reports due (no extensions unless arranged for in advance:) Ozarks Feb. 14, Ouachitas Feb. 21, Great Plains Mar. 6, Southern Rockies Mar. 20, Wyoming Basin and Middle Rockies Mar. 27, Northern Rockies Apr. 10, Columbia Plateau Apr.24, Colorado Plateau May 1, Basin and Range May 15, Sierra-Cascade May 29, Pacific Border and map June 5.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Calendar, 2nd Semester, 1939

Where not stated, pages in Fenneman, Physiography of Western United States. References in ( ) for graduates and majors in geography or geology who will be asked questions on them both in class and exams

Feb. 6 Organization
8 Great Plains 1-16.
10 16-37

13 37-50
15 50-69
17 69-91 (G.S.A. 35; 385-423)

20 Southern Rockies 92-107
24 108-117 (G.S.A. 49: 957-980)

27 (Bull. 730: 1-17; G.S.A. 46, 1291-1350, 2046-2054)
Mar. 1 117-132 (p.p. 166: 11-31)
3 Exam

6 Wyoming Basin 133-149
8 Middle Rockies 150-166 (G.S.A. 48, 813-894)
10 166-182 (P.P. 185: 167-199; J.G. 41, 243-267)

13 Northern Rockies 183-197 (J. G. 13: 105-125; E.G. 11: 697-740)
15 197-211 (J.G. 32: 472-487)
17 211-224 (J.G. 37: 747-764; W.S.P. 539, 38-44)

20 Columbia Plateau 225-237
22 238-251
24 251-264

27 (Grand Coulee by Bretz; 3-20, 43-83; J.G. 36, 193-223, 312-341)
29 264-273 (G.S.A. 44: 675-722; G.S.A. 49, 461-524)
31 Review

Apr. 3 Exam
5 Colorado Plateau 274-291
7 (Geogr. J. 81; 227-248; Sci. 72: 463-467; Nat. G.M. 53: 721-730)

10 291-306
12 306-320
14 320-323 (A.J.S.(4) 24, 109-129)

Recess

24 Basin and Range 326-340
26 340-355 (J.G. 39: 133-140; Geogr. R. 22: 656-665)
28 355-373

May 1 373-390 (Bull. 798: 135-150; G.S.A. 47: 1470-1476; G.S.A. 45: 551-566)
3 390-395
5 Exam

8 Sierra Cascade 396-409
10 409-427 (Coombs; U.Wash. Bull. 3, 191-210; P.P. 160: 22-54, 84-103)
12 427-441 (G.S.A. 49; 831-930; Nat. Geog. Mag. 71: 327-343)

15 Pacific Border 442-459
17 458-471
19 427-486 (A.A.P.G. 18: 487-498)

22 486-500 (G.S.A. 36: 641-678)
24 500-510 (A.A.P.G.11: 417-424; A.A.P.G. 12: 515-526)
26 Review

29 Review
31 Reivew
June 2 Review

June 12 Final exam 8A.M. Room to be announced.

Notice for five credit students:
Map showing provinces, subdivisions, all quadrangles, etc. will be checked with every report. Keep in drawer ready for checking. Note deadlines (no extension): Great Plains Feb. 20; Southern Rockies March 6; Middle Rockies Mar. 20; Northern Rockies Apr. 3; Columbia Plateau Apr. 24; Colorado Plateau May 1; Basin-Range May 15; Sierra Cascade May 29; Pacific Border June 9.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Calendar, 2nd Semester, 1937-38

Where not states pages in Fenneman, Physiography of Western U. S. References in ( ) for graduates and majors in geography or geology who will be asked questions on them both in class and exams.

Feb.7 Organization
9 Ozark Plateau, Bowman 451-455 (Mo. G.S. 10:15-63, 94-109; A.G. 27: 25-47)
11 Ouachita Mts. Bowman 455-456; Bull. 808; 4-21, 136-148 (AAPG 15: 991-997, 1016-1029, 1044-1054)

14 Great Plains 1-16
16 *16-37 (Neb.G.S. 10:24-31, 81-91, 128-155)
18 37-50

21 50-69
23 69-91 (G.S.A. 35:385-423)
25 Southern Rockies 92-107

28 108-117 (Bull. 730:1-17; G.S.A. 46: 1291-1350, 2046-2054)

Mar.2 117-132 (P.P. 166: 11-31)
4 Exam

7 Wyoming Basin 133-149
9 Middle Rockies 150-165 (G.S.A. 48: 813-894)
11 166-182 (P.P. 185: 167-199; J.G. 41: 243-267)

14 Northern Rockies 183-197 (J.G. 13: 110-125; E.G. 11: 697-740)
16 *197-211 (J.G. 32: 472-487)
18 211-224 (J.G. 37: 747-764; W.S.P. 539: 38-44)

21 Columbia Plateau 225-237
23 *238-251
25 251-264

28 (Grand Coulee: 3-20, 43-83; J.G. 36: 193-223, 312-341)
30 264-273 (G.S.A. 44: 675-722; G.S.A. 47: 1849-1884)

Apr.1 Review

Apr.4 Exam
6 Colorado Plateau 274-291
8 (Geogr.J. 81: 227-248; Sci 72: 463-467; Nat. G.M. 53; 721-730)

11 291-306
13 *306-320
15 320-323 (A.J.S. (4) 24; 109-129

25 Basin and Range 326-340
27 *340-355 (J.G. 39: 133-140; Geogr. R. 22: 656-665)
29 355-373

May 2 373-390 (Bull. 798: 135-150; G.S.A. 47: 1470-1476; G.S.A. 45: 551-566)
4 390-395
6 Exam

9 Sierra-Cascade 396-409
11 *409-427 (Mt. Rainier Nat. Park: 191-210; P.P. 160: 22-54, 84-103)
13 427-441 (G.S.A. 47; 1809-1830; Nat. G. M. 71: 327-343)

16 Pacific Border 442-458
18 458-471
20 472-486 (G.S.A. 36: 641-678; A.A.P.G. 18; 487-498)

23 486-500
25 *500-510 (A.A.P.G. 11: 417-424; A.A.P.G. 12: 515-526)
27 Review

June 1 Review
3 Review
10 *Last reports due by 4:30 P. M.
14 Final exam 8 A.M. Room to be assigned.

Notice to five credit students:

Map showing provinces, all quadranges, etc. will be checked when each report is due. Note deadlines: Ozarks, Ovachitas, Feb. 16; Great Plains, Mar. 2; Southern Rockies, Mar. 16; Middle Rockies, Mar. 23; Nor. Rockies, Mar. 30; Columbia Plateau, Apr. 13; Col. Plateau, Apr. 27; Basin-Range, May 11; Sierra-Cascade, May 25; Pacific Border, June 10. Dates marked * above. These times will not be extended.

(8)

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Calendar, 2nd. Semester, 1936-37

Pages in Fenneman, Physiography of Western United States.

Feb.	8	Organization
	10	Ozarks, Ouachitas, etc. Bowman 451-459. Bull. 808, 4-21, 136-148.
	12	O. G. S. 52, 1-21, illus.; Prof. P. 31, 13-17, 34-39. Fredericksburg Bull 808
	15	Fenneman, Great Plains 1-16
	17	16-37
	18	37-50
	24	50-69
	26	69-91
Mar.	1	Southern Rockies 92-107
	3	108-117
	5	117-132
	8	Exam
	10	Wyoming Basin 133-149
	12	Middle Rockies 150-165
	15	166-182
	17	Northern Rockies 183-197
	19	197-211
	22	211-224
	24	Columbia Plateau 225-237
	26	238-251
	29	251-264
	31	264-273
Apr.	1	Review
	5	Exam
	7	Colorado Plateau 274-291
	9	291-306
	12	306-320
	14	320-323
	16	Nat. G. Mag. 53, 721-730; Sci. 69, 485-487

Recess

Apr.	26	Basin and Range 326-340
	28	340-355
	30	355-373
May	3	373-390
	5	390-395
	7	Exam
	10	Sierra-Cascade 396-409
	12	409-427
	14	427-441
	17	Pacific Border 442-458
	19	458-471
	21	472-486
	24	486-500
	26	500-510
	28	Review, 100 questions
June	2	Review, Cont.
	4	Review, Cont.
	14	Final exam 8 A. M. Room to be assigned

NOTICE FOR FIVE CREDIT STUDENTS

Laboratory reports due the day the next province is begun in class unless otherwise announced. Unexcused late reports may be denied credit. Do not forget to show province boundaries, subdivisions, and all quadrangles on your map. Map from back of text book may be used if desired:

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2nd Semester, 1935-1936

(7)

Pages in Fenneman, Physiography of Western U.S.

Feb.	10	Organization
	12	Ozarks, Ouachitas, etc. Bowman 451-459. Bull. 808, 4-21, 136-148.
	14	O.G.S. 52, 1-21, illun,; Prof. P. 31, 13-17, 34-39.
	17	Fenneman, Grant Plains 1-16
	19	16-37
	21	37-50
	24	50-69
	26	69-91
	28	Southern Rockies 92-107
Mar.	2	108-117
	4	117-132
	6	Review
	9	Exam
	11	Wyoming Basin 137-149
	13	Middle Rockies 150-165
	16	166-182
	18	Northern Rockies 183-197
	20	197-211
	23	211-224
	25	Columbia Plateau 225-237
	27	238-251
	30	251-264
Apr.	1	264-273
	3	Review
	6	Exam
	8	Colorado Plateau 274-291
	10	291-306
	13	306-320
	15	320-323
	17	Nat. G. Mag. 52, 721-730; Sci. 69, 485-487
Apr.	27	Basin and Range 326-340
	29	340-355
May	1	355-373
	4	373-390
	6	390-395
	8	Exam
	11	Sierra-Cascade 396-409
	13	409-427
	15	427-441
	18	Pacific Border 442-458
	20	458-471
	22	472-486
	25	486-500
	27	500-510
	29	Review, 100 questions
June	1	Review, cont.
	3	Review, cont.
	5	Review, cont.
	16	Final exam 8 A.M.

Recess

NOTICE FOR FIVE CREDIT STUDENTS

Laboratory reports due the day the next province is begun in class unless otherwise arranged for. Unexcused late reports may be denied credit. Do not forget to show province boundaries, subdivisions, and all quadrangles on your map. Map from back of text book may be used if desired.

(6)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2nd Semester, 1934-1935

Feb. 11 Organization
13 Ozarks, Ouachitas, etc. Bowman 451-459; Bull. 808, 4-21, 136-146
15 O.G. S. 52, 1-21, illus.; Prof. P. 31, 13-17, 54-59

18 Fenneman, Great Plains 1-16
20 16-37

25 37-50
27 50-59
Mar. 1 69-91

4 Southern Rockies 92-107
6 108-117
8 117-132

11 Review
13 Exam
15 Wyoming Badin 133-149

18 Middle Rockies 150-166
20 166-182
22 Northern Rockies 183-197

25 197-211
27 211-224
29 Columbia Plateau 225-237

Apr. 1 238-251
3 251-264
5 264-273

8 Review
10 Exam
12 Colorado Plateau 274-291

15 291-306
17 306-320
19 320-325; Nat. G. Mag. 53, 721-730; Sci.69, 485-487

Recess

Apr. 29 Basin and Range 326-340
May 1 340-355
3 355-373

6 373-390
8 390-395
10 Exam

13 Sierra-Cascade 396-409
15 409-427
17 427-441

20 Pacific Border 442-458
22 458-471
24 472-486

27 486-500
29 500-510
31 Review, 100 questions

June 3 Review, cont.
5 Review, cont.
7 Review, cont.

17 Final exam 8 A. M.

NOTICE FOR FIVE CREDIT STUDENTS

Laboratory reports due the day the next province is begun in class unless otherwise arranged for. Unexcused late reports may be denied credit. Do not forget to show province boundaries, subdivisions, and all quadrangles on your map. Map from back of text book may be used if desired.

(5)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2nd Semester, 1933-1934

Unless otherwise stated pages are in Fenneman, Physiography of western United States. Other books on reserve shelf in library.

Feb.	5	Ozarks, Arbuckles, Wichitas, Ouachitas
	7	Bowman 451-459; Bull. 808, 4-21, 136-146
	9	Okla. G. S. 52, 1-21, illus.: Prof. Paper 31, 13-17, 54-59
	12	Great Plains 1-16
	14	16-37
	16	37-50
	19	50-59
	21	69-91
	23	Southern Rockies 92-107
	26	108-117
	28	117-132
Mar.	2	Prof. Paper 166, 11-31
	5	Exam
	7	Wyoming Basin 133-149
	9	Middle Rockies 150-166
	12	166-182
	14	Northern Rockies 183-197
	16	197-211
	19	211-224
	21	Jour. Geol. 21, 224-231; J. G. 38, 643-663; J. G. 37, 746-764
	23	Columbia Plateau 225-237
	26	228-251
	28	251-264
	30	264-273
Apr.	2	Exam
	11	Jour. Geol. 31, 617-649; G. S. A. 44, 675-772
	13	Colorado Plateau 274-291
	16	291-306
	18	306-320
	20	320-325; Nat. Geogr. Mag. 53, 721-730
	23	Basin and Range 326-340
	25	340-355
	27	355-373
	30	373-390
May	2	390-395; Jour. Geol. 39, 133-140
	4	Exam
	7	Sierra-Cascade 396-409
	9	409-427
	11	427-441
	14	Pacific border 442-458
	16	458-471
	18	472-486
	21	486-500
	23	500-510
	25	Review
	28	Review
June	1	Review
	12	Final exam 8 A. M.

(4)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2nd Semester, 1932-1933

Unless otherwise stated pages are in Fenneman, Physiography of western United States

1933-34

Feb. 6 Ozarks, Arbuckles, Wichitas, Quachitas

8 Bowman 451-459; Bull. 808, 4-21, 136-146

10 Oklahoma Geol. Surv. 52, 1-21, photos; Prof. Paper 31, 13-17; 54-59

13 Great Plains 1-16

15 16-37

17 37-50

20 50-59

24 69-91

27 Southern Rockies 92-107

Mar. 1 108-117

3 117-132

6 Exam

8 Prof. Paper 166, 11-31

10 Wyoming Basin 133-149

13 Middle Rockies 150-166

15 166-182

17 Northern Rockies 183-197

20 197-211

22 211-224

24 Jour. Geol. 29, 139-147, 410-414 or Jour. Geol. 38, 643-663 or Jour. Geol. 32, 472-487 (37-746-764)

27 Columbia Plateau 225-237

29 228-251

31 251-264

Apr. 3 Exam

Apr. 12 264-273

14 Jour. Geol. 31, 617-649 or G. S. A. 42, 923-984

17 Colorado Plateau 274-291

19 291-306

21 306-320

24 320-325; Nat. Geogr. Mag. 58, 721-730

26 Basin and Range 326-340

28 340-355

May 1 355-373

3 373-390

5 390-395; Jour. Geol. 39, 133-140

8 Exam

10 Sierra-Cascade 396-40

12 409-427

15 427-441

17 Pacific Border 442-458

19 458-471

22 472-486

24 486-500

26 500-510

29 Review, 100 questions

31 " " "

June 2 " " "

12 Final exam 8 A. M.

12 " " "

NOTICE FOR FIVE CREDIT STUDENTS

The large scale Lobeck Physiographic Diagram of the U. S. is to show not only the location of all quadrangles but also the limits of all provinces studied including limits of subdivisions. See map in back of Fenneman. The map is to be up to date and handed in with every report.

(3)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2nd semester, 1931-1932

Pages in Fenneman, Physiography of western United States

Feb.	8	Ozarks, Arbuckles, Wichitas, Ouachitas	Apr.	13	251-264
	10	Bowman 451-459		15	264-273 reports
	12	Reports		18	Colorado Plateau 274-291
	15	Great Plains 1-16		20	291-306
	17	16-37		22	306-320
	19	37-50		25	320-325 reports
	24	50-69		27	Basin and Range 326-340
	26	69-91		29	340-355
	29	Southern Rockies 92-107	May.	2	355-373
Mar.	2	108-117		4	373-390
	4	117-132		6	390-395 reports
	7	Exam		9	Exam
	9	Wyoming Basin 133-149		11	Sierra-Cascade 396-409
	11	Middle Rockies 150-166		13	409-427
	14	166-182		16	427-441
	16	Reports		18	Pacific border 442-458
	18	Northern Rockies 183-197		20	458-471
	21	197-211		23	472-486
	23	211-224		25	486-500
	25	Reports		27	[illegible]-510
	28	Columbia Plateau 225-237	June	1	Review
	30	228-251		3	Review
Apr.	1	Review		14	Final exam 8 A. M.
	4	Midsemester exam			

Notice for 5 credit students
All reports on laboratory work are DUE THE DAY THE NEXT PROVINCE IS STARTED IN CLASS. Unexcused late reports will receive no credit.
Summaries must give headings and follow outline given for first semester.
Section on boundaries should not simply list adjoining provinces but define the physical difference along the boundary line, such as "foot of the mountains", or "border of pre-Cambrian rocks."
Written reports on readings are required of all students and must not exceed one page in length written on both sides if absolutely necessary.

2 first edition

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2d Semester, 1930-1931
Pages in Bowman's Forest Physiography

Feb.	9	Ozarks and Ouachitas	Apr. 15	268-276
	11	451-459	17	276-286
	13	Reports		
			20	286-297
	16	Great Plains, 405-410	22	Reports
	18	410-430	24	Basin and Range, 210-217
	20	431-440		
			27	217-235
	25	440-450	29	236-245
	27	Reports	May 1	246-255
Mar.	2	Reports	4	387-404
	4	Southern Rockies, 356-362	6	Reports
	6	362-370	8	Examination
	9	370-376	11	Columbia Plateau, 192-200
	11	376-386	13	200-209
	13	Reports	15	Reports
	16	Examination	18	Pacific Coast, 149-162
	18	Northern Rockies, 298-306	20	162-176
	20	307-317	22	177-191
	23	317-328	25	127-138
	25	329-355	27	138-148
	27	Reports	29	Reports
	30	Reports	June 1	Review
Apr.	1	Review	3	Review
	3	Examination	5	Review
	6	Colorado Plateau, 256-268	15	Final Examination, 8 A. M.

Notice for 5 credit students

Summaries strictly limited to four (4) pages

Place Geology before Topography

Reports are due on date assigned for begining next province in class.

(2)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Calendar, 2d Semester, 1930-1931
Pages in Bowman's Forest Physiography and Fenneman's Physiography of western United States

Feb. 9	Ozarks and Ouachitas	Apr. 15	268-276, 286-294, 312-319
11	451-459	17	276-286, 294-303
13	Reports		
		20	286-297, 304-312, 320-325
16	Great Plains, 405-410, 1-11	22	Reports
18	410-430, 11-37	24	Basin and Range, 210-217, 326-330, 349-367
20	431-440, 47-60		
		27	217-235, 330-349
25	440-450, 61-91, 410-414	29	236-245, 367-379
27	Reports	May 1	246-255, 379-390
Mar. 2	Reports	4	387-404, 390-395
4	Southern Rockies, 356-362, 37-47,	6	Reports
6	362-370, 98-110 (92-98	8	Examination
9	370-376, 110-114	11	Columbia Plateau, 192-200, 225-248
11	376-386, 115-132	13	200-209, 248-273
13	Reports	15	Reports
16	Examination	18	Pacific Coast, 149-162, 396-398,
18	Northern Rockies, 298-306, (183-185,	20	162-176, 398-417 417-441
20	307-317, 203-213 (200-205	22	177-191, 442-454, 472-481
23	317-328, 186-199, 213-224	25	127-138, 481-510
25	329-355, 133-182	27	138-148, 455-471
27	Reports	29	Reports
30	Reports	June 1	Review
Apr. 1	Review	3	Review
3	Examination	5	Review
6	Colorado Plateau, 256-268, 274-285, 294-303	15	Final Examination, 8 A.M.

Notice for 5 credit students

Summaries strictly limited to four (4) pages

Place Geology before Topography

Reports are due on date assigned for beginning next province in class

Personal

(1)

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
2d. Semester, 1929-1930
Pages in Bowman's Forest Physiography

Feb.	10	Ozarks and Ouachitas, 451-459
	12	Maps and reports
	14	Great Plains, 405-410
	17	410-430
	19	431-440
	21	440-450
	24	Maps and reports
	26	Maps and reports
	28	Exam
March	3	Southern Rockies, 356-362
	5	362-370
	7	370-376
	10	376-386
	12	Maps and reports
	14	Maps and reports
	17	Northern Rockies, 298-306
	19	307-317
	21	317-328
	24	Maps and reports
	26	Maps and reports
	28	Maps and reports
	31	Midsemester exam
Apr.	2	Colorado Plateau, 256-268
	4	268-276
	7	276-286
Apr.	16	286-297
	18	Maps and reports
	21	Maps and reports
	23	Basin and Range, 210-217
	25	217-235
	28	236-245
	30	246-255
May	2	387-404
	5	Maps and reports
	7	Maps and reports
	9	Exam
	12	Columbia Plateau, 192-200
	14	200-209
	16	Maps and reports
	19	Pacific Coast, 149-162
	21	162-176
	23	177-191
	26	127-138
	28	138-148
June	2	Maps and reports
	4	Maps and reports
	6	Review

Final exam June 17

GEOLOGY 130
PHYSIOGRAPHY OF WESTERN UNITED STATES
Great Plains, laboratory, edition, 1940-41.

High Plains. Camp Clarke, Nebraska, Folio 87.
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Text p. 17-19. Account for the sand dunes. Text p. 19-21. What conditions favor valley widening here?

Laken, Kansas and geological map of Kansas. Folio 212.
What different kinds of depressions occur in south part of the map? Account for the streams which do not reach the Arkansas. (Text pp. 14-16).

Raton Section. Raton, Brilliant, and Koehler Folio 214. (Text pp. 37- 47). Locate examples of erosion levels preserved under lava or volcanic cones.

Black Hills. Central Black Hills Folio 219. (Text pp. 79-86).
Draw an idealized east-west section (see section sheet) across the Black Hills labeling the formations which form hogback ridges. What is origin or physiographic name of (a) Citadel Rock, NW corner (b) Lakota Peak near Hermosa (c) Robbers Roost, (d) Buffalo Gap, (e) French Creek E. of Custer, (f) South Fork of French Creek, (g) valley west of Jackson's Ranch NW of Custer, (h) Centennial Prairie, (i) valley between Sturgis and Whitewood, (j) Needles, (Center).

Pecos Section. Tucumcari and geological map of New Mexico. (Text pp. 47-50). Account for the mesas. What evidence suggests that this area was once covered with Tertiary stream deposits? Why more eroded than farther east?

Missouri Plateau - glaciated and unglaciated. Cut Bank, Mont. Glacial map of Montana (24-40). Account for the escarpment. What types of glacial and glacio-acqueous deposits occur? What interglacial deposit?

Missouri Plateau - glaciated. Cherry Ridge, Montana.
Locate areas of terminal moraine, glaciated terrace, also telling how you recognized each.

Missouri Plateau - unglaciated and glaciated.
Glendive, Mont. See glacial map of Montana.
Locate remnants of three terraces and find their ages in reference to the drifts. What effect did glaciation have on topography? (Text pp. 63-67).

Edwards Plateau - Nueces folio, Texas No. 42.
What evidence suggests a relatively recent uplift of this region? (Text pp. 59-60).

Llano District. Llano - Burnet folio, Texas No. 183. (Text pp. 58-59).
Account for the disregard of rock character shown by major streams. What causes the granite to be weaker than limestone? See Plate X.

Colorado Piedmont. Castle Rock. Folio, Colorado No. 198.
What past physiographic conditions do the Tertiary deposits indicate? What became of the latest Tertiary now found farther east? Explain.

Label in your map besides the quadrangles and boundaries (a) Pine Ridge, (b) Black Hills, (c) Little Rocky Mts., (d) Sand Hills, (e) Bearpaw Mts., (f) Highwood Mts. (g) Skonkin Sag, (h) Goshen Hole, (i) Llano Estacado, (j) limit of drift, (k) limit of Wisconsin Drift (text p. 72). SUMMARY AS USUAL.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Ouachita Mountains, Edition 1940-41

DeQueen, Ark. See U.S.G.S. Bull. 808 (available from office or library.)
What physiographic provinces shown on this map? Describe what surface features show this boundary on the map. Text pp. 682-685. What evidence indicates two cycles of erosion? Text p. 685. Study structure sections in Bull. 808 and account for mountains. Text pp. 676-681. Judging from the drainage what do you conclude has happened since the coastal plain sediments extended farther north? Check on structure sections.

Hot Springs and vicinity, top. and geological maps. Folio 215.
What is the most resistant kind of rock here and how does this fact show in the topography? Gaps across ridges narrow in the direction of dip. Apply all criteria to Trap Mt., West Mt., Sugarloaf Mt., and Indian Mt. What causes the difficulty? Does the rule that an anticline has a long gentle nose and a syncline a short nose apply here?

Booneville, Arkansas
What structure is shown south of Magazine? How does topography show direction of dip? What structure is found southwest of Booneville? Account for course of Petit Jean Creek giving more than one hypothesis. What direction of dip is shown in ridges north of Boonville to Pine Ridge? How could you account for the ridges in northeast corner of map which do not conform in direction?

Little Rock, Arkansas
Read the legend on back. Find the border of the Coastal Plain. Account for differences in course of Arkansas River above and below Little Rock. What evidence suggests that the Coastal Plain sediments were deposited on a surface of very low relief? That the Coastal Plain once extended farther inland?

Summary on outline previously given.
Locate on map (a) Athens Plateau, (b) Arkansas valley section. (If you took first semester). Compare physiographic history of this province with that of Ridge and Valley province. See text pp. 685-689.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Laboratory, Ozark Plateau, Edition 1940-41

Eureka-Harrison Folio No. 202.

Read sections on Geology and Geography of Ozark region, Topography, and Geologic History of Mesozoic and Cenozoic. Show by a cross section (see structure section sheet) the three benches. Draw section from Red Bank NE to Lowry. Horizontal scale same as map; vertical 1 inch = 2000 feet. Geology students show formations. Indicate the resistant rocks causing them with the names used in Missouri.

Coldwater, Mo. See geological Map of Missouri, 1939.

70 Account for the mountains and compare with a similar area in Wisconsin. (Text pp. 645-647) What is meaning of entrenched meanders? (Text pp. 642-645).

Kimmswick, Mo. See geological map of Missouri, 1939.

71 What provinces and sections of each are shown? What bed rock formations are present? Account for distribution of depression contours. Locate a prominent escarpment. To what structure is part of it related?

Summary:

Show on map (a) St. Francis Mts., (b) Mississippian escarpment, (c) Boston Mts., (d) Springfield Platform, (e) Salem Platform, (f) Escarpment at top of Cambrian ss. (g) Escarpment at top of St. Peter ss., (h) border of glaciation. (Text p. 632). Discuss evidence of more than one cycle of erosion. (See sections on p. 635, also Text, pp. 659-662).

Write a four page summary.

Give headings for each section.
Definition (be concise and to the point)
Boundaries (give geological, topographic features besides a list of adjoining provinces).
Geology (emphasis on kind rather than age of rocks).
Topography (include here discussion of subdivisions).
Physiographic history (start with oldest event which affects present surface. Separate conclusions from facts stated above).

Hand in reports, in folders, avoiding paper clips. Do not forget to locate quadrangles and boundaries (including those of subdivisions of the province) on your map and hand this is when required.

Answers to questions above may be included in summary as examples. If you elect to do this the four page limit is not enforced.

Give key to numbers of quadrangles and letter other features neatly.

Keep this sheet for future reference.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Laboratory, Ozark Plateau, Edition 1939-1940

Eureka-Harrison Folio No. 202.

Read sections on Geology and Geography of Ozark region, Topography, and Geologic History of Mesozoic and Cenozoic. Show by a cross section (structure section sheet) the three benches. Indicate the resistant rocks causing them with the names used in Missouri. (Text p. 632, 647-659)

Coldwater, Mo. See geological Map of Missouri.

Account for the mountains and compare with a similar area in Wisconsin. (Text pp. 645-647) What is meaning of entrenched meanders? (Text pp. 642-645)

Summary:

Show on map (a) St. Francis Mts., (b) Mississippian escarpment, (c) Boston Mts., (d) Springfield Platform, (e) Salem Platform, (f) Escarpment at top of Cambrian ss. (g) Escarpment at top of St. Peter ss., (h) border of glaciation. (Text p. 632) Discuss evidence of more than one cycle of erosion. (See sections on p. 635 also Text, pp. 659-662.)

Write a four page summary.

Give headings for each section.

Definition (be concise and to the point)

Boundaries (give geological, topographic features besides a list of adjoining provinces).

Geology (emphasis on kind rather than age of rocks).

Topography (include here discussion of subdivisions).

Physiographic history (start with oldest event which affects present surface. Separate conclusions from facts stated above).

Hand in reports, in folders, avoiding paper clips. Do not forget to locate quadrangles and boundaries (including those subdivisions of the province) on your map and hand this in when required. Locate also on map (a) Pine Ridge (b) Black Hills (c) Little Rocky Mts., (d) Sand dunes of Nebraska (e) Bearpaw Mts., (f) Highwood Mts., (g) Shonkin Sag, (h) Goshen Hole, (i) Llano Estacado, (j) limit of glaciations, (k) terminal moraine. (See Text, fig. 27, p. 72.

Answers to questions above may be included in summary as examples. If you elect to do this the four page limit is not enforced.

Give key to numbers of quadrangles and letter other features neatly.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Ouachita Mountain Edition 1939-40

Caddo Gap, Ark.

What physiographic provinces shown on this map? Describe what surface features show this boundary on the map. Text pp. 682-685. What evidence indicates two cycles of erosion? Text p. 685. Study structure sections in above and account for the bends in Caddo Mt. and for the structure of Nelson Mt. Text pp. 676-681.

Hot Springs and vicinity, top. and geological maps. Folio 215.

What is the most resistant kind of rock here and how does this fact show in the topography? Gaps across ridges narrow in the direction of dip. Apply all criteria to Trap Mt., West Mt., Sugarloaf Mt., and Indian Mt. What causes the difficulty? Does the rule that an anticline has a long gentle nose and a suncline a short nose apply here?

Winding Stair, Okla.

Account for the topography near Heavener by using the state geological map.

Little Rock, Ark.

Read the legend on back. Find the border of the Coastal Plain. Account for differences in course of Arkansas River above and below Little Rock. What evidence suggests that the Coastal Plain sediments were deposited on a surface of very low relief? That the Coastal Plain once extended farther?

Summary on outline previously given.

Locate on map (a) Athens Plateau, (b) Arkansas valley section. Compare physiographic history of the province with that of Ridge and Valley province (if you took first semester). See text pp. 685-689.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Great Plains, laboratory, edition, 1939-40

High Plains. Camp Clarke, Nebraska, Folio 87.
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Text p. 17-19. Account for the sand dunes. Text p. 19-21. Why is erosion farther advanced here than it is farther east in the Great Plains?

Lakep, Kansas and geological map of Kansas. Folio 212.
What different kinds of depressions occur in south part of the map? Account for the streams which do not reach the Arkansas. (Text pp. 14-16.)

Raton Section. Raton, Brilliant, and Koehler Folio 214. (Text pp. 37-47).
Read sections on "geography of the Great Plains province, " Geology of the Great Plains and the Rocky Mts., " "topography," " drainage," and "geologic history" from past-Cretaceous uplift and erosion on. Locate examples of erosion levels preserved under lava , of volcanic cones.

Black Hills. Central Black Hills Folio 219. (Text pp. 79-86.)
Read "configuration of the Black Hills" p. 1, "geology of the general region," p.2, and "early Tertiary mountain growth" through "Quaternary uplift and erosion "pp. 25-26. Draw an idealized east-west section (see section sheet) across the Black Hills labeling the formations which form hogback ridges. What is origin of physiogra hic name of (a) Citadel Rock, (b) Dakota Peak near Hermosa, (c) Robbers Roost, (d) Buffalo Gap, (e) French Creek E. of Custer, (f) South Fork of French Creek, (g) valley west of Jackson's Ranch NW of Custer, (h) Centennial Prairie, (i) valley between Sturgis and Whitewood, (j) Needles.

Pecos Section. Tucumcari and geological map of New Mexico. (Text pp. 47-50)
Account for the mesas. What evidence suggests that this area was once covered with Tertiary stream deposits? Why more eroded than farther east?

Missouri Plateau - glaciated. Bismarck, North Dakota (areal Geology). Folio 181. (Text pp. 72-75). Why does valley of Missouri narrow downstream? Why and when did the river assume its present course? (See Fenneman (text pp. 76-79) and note the Foleo gives another interpretation.)

Missouri Plateau - unglaciated and glaciated.
Glendive, Mont. See glacial map of Montana.
Locate remnants of three terraces and find their age in reference to the drift. What effect did glaciation have on topography? (Text pp. 63-67.)

Edwards Plateau - Nueces folio, Texas No. 42
What evidence suggests a relatively recent uplift of this region? (Text pp. 59-60.)

Llano District. Llano - Burnet folio, Texas No. 183. (Text pp. 58-59.)
Read section on "General Geography and Geology, "Geologic History," Account for the disregard of rock character shown by major streams. What causes the granite to be weaker than limestone? See Plate X.

Colorado Piedmont. Castle Rock. Folio, Colorado No. 198.
What past physiographic conditions do the Tertiary deposits indicate? What became of the latest Tertiary now found farther east? Explain.

Label in your map besides the quadrangles and boundaries (a) Pine Ridge, (b) Black Hills, (c) Little Rocky Mts., (d) Sand Hills, (e) Bearpaw Mts., (f) Highwood Mts. (g) Skonkin Sag, (h) Goshen Hole, (i) Llano Extracado, (j) limit of drift, (k) limit of Wisconsin Drift (text p.72)

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES

Southern Rockies, Laboratory. Edition 1939-40

Livermore, Colorado and geological map of Colorado
What evidence is here found that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Name the formations in the two hogbacks along the foot of the Range. (Text, p. 96)

Leadville, Colorado
Account for the outlines of the ridges in Park Range. (Text, pp. 111-113) Why are these features best developed on the east side? Account for the smooth ridge tops. Locate examples of hanging valleys; of terminal moraines; of cirques.

Central City, Colorado
Study to see if you can find evidence of more than one stage of peneplaination (low relief) of the mountains. (Text, pp. 96-98) Account for the lakes and their distribution including the step-like arrangement. Locate remnants of preglacial surface.

Canon City, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow? (Text, p.110)

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region," "Geography," and "Geologic History," and examine the Illustration Sheets. What evidence of peneplaination of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II.) What formations make hogbacks? Why are hogbacks not continuous along the foot of the mountain? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Sheridan, Wyoming. State geological map. See also G.S.A. 49; 1718-1721. (Text, pp. 99-100) Draw a cross section with a vertical scale not less than 1600 feet to an inch from Ames Monument through E in Ozone to T 13 N in east margin of map. (Geology students)-Show geology. What does this show as to age of the upland? What is the slope in feet per mile? Is it a peneplain or a pediment? (G.S.A. 46, 2046-2054)

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range, and the western part of the Great Plains showing (a) after post-Cretaceous uplift and erosion, (b) completion of High Plains deposits, (c) Pleistocene glaciation, and (d) present. See Text, p.107. In the history include discussion of alternative theories as given in class.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Middle Rockies, and Wyoming Basin
Edition of 1939-40
Consult Geological map of Wyoming

Meeteetse and Oregon Basin quadrangles, Wyoming. See G.S.A. 48, 813-894. In what geographic feature are these quadrangles? Account for Little Buffalo Basin and for Spring Creek Basin. To what class of streams does Greybull River belong? Account for the course of Little Buffalo Creek. On the Oregon Basin quadrangle explain the ridges around Oregon Basin. Account for Elk Butte for the offsets in parts of the bordering ridge, for instance northeast of Loch Katrine and near B. M. 5311 in T. 50N., R. 100W. Suggest possible explanations for the enclosed part of the Oregon Basin around the lake. (text pp. 140-141) Account for the gently sloping crests of Meeteetse Rim.

Gallatin quadrangle, Wyoming. Folio No. 30.
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Account for Gallatin Range. To what province does it belong? Why are geysers and hot springs so common here? How is heat communicated to ground water?

Gilbert Peak quadrangle, Utah-Wyoming. See Prof. Paper 185, also Prof. Paper 61 and model on stairs. How is the structure of the Uinta Mountains shown in the remnants of the pre-glacial surface? What has been the effect of glaciation? (text pp. 178-182) Why was glacial erosion here more effective on the south rather than on the north side of the range as is more common? Locate examples of the Gilbert Peak pediment; Bishop conglomerate; terminal moraines; Bear Mt. pediment; Browns Park formation, hogbacks.

Grand Teton quadrangle, Wyoming. (Jour. Geol. 43, 381-397; text p. 169) Show the structure of the Teton mountains by a cross section through Jackson Lake across the quadrange. In your summary explain two hypotheses of the origin of the mountains. What effects of glaciation can you distinguish?

Cloud Peak quadrange, Wyoming. Folio No. 142.
Explain effects of glaciation. Why are the cirques so well developed? (text pp. 162-164) Note expecially the topography just east of Misty Moon Lake. Locate several "flatirons" and account for them.

Rocks Springs, Wyoming.
Account for the north-south ridge east of Rock Springs using a sketch. Accouht for the intricate erosion of parts of Baxter Basin; for the lakes, for the gap east of Rock Springs. (text p. 138)

Saddleback Hills, Wyoming.
Account for the hills giving a sketch of structure. Account for the curved ridges in Northeast corner; for the course of Little Medicine Bow River; for the ridge near Allen.

Walcott, Wyoming.
Account for the ridge northeast of Fort Steele using a sketch section about 5 miles long.
Write a summary of the province on same outline as before. Do not forget to give headings. Include summary of present interpretation of history of Uinta Mts., including an alternative hypothesis, and history of Yellowstone Plateau.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Northern Rockies, Edition 1939-40

Map and aerial view of Glacier National Park and map of glacial deposits of Montana 24-40. (U. S. G. S. Bull. 600)
Compare the vigor of glaciation here with that of other areas thus far studied in the Rocky Mountains. Explanation? Account for the distribution of surviving glaciers. Locate several cirques, aretes (narrow divides), rock steps (explain) and "horns". Explain with a cross section the structure of the mountain front including Chief Mountain. Account for Chief Mountain. (text pp. 205-209)

Hamilton quadrangle, Montana-Idaho
Suggest possible explanations of (a) the straight border of the Bitteroot Mountains (b) straight courses of some of the streams within the mountains. (text pp. 198-200)

Saypo quadrangle, Montana
Illustrate with sections four (4) different possible structural interpretations of the origin of the hogbacks as given in class.

Rathdrum quadrangle, Idaho
Account for the lakes. Have you seen the same thing in the field. See Annals, Association American Geographers, vol. 10, pp. 114-117 or "Outline of Glacial Geology", p.44.

Philipsburg Folio, No. 196, Montana (library) Text pp. 213-217)
Read sections in Introduction of "relief" and Drainage"; "topography," p.2 "Tertiary and Quaternary systems," pp. 10-12; "Physiography," p. 21; "Physiographic development" and "Quaternary Period," p.23. Account for Philipsburg Valley and its narrow outlet. Account for the present conditions at Georgetown Lake.

Letter on map (a) area of granitic rock (b) Rocky Mt. trench (c) Purcell Trench (d) Tertiary basins within mountains (text p. 220 and map of U. S.)
(e) edge of continentat drift (G. S. A. 40, 648-649)

Write a summary of the province on outline previously given. This should include in proper places a discussion of (a) was there once a peneplain which is now dissected and (b) what relations do the Tertiary-filled valleys have to this surface? Use diagrams where needed to save writing but refer to them in your text.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Columbia Plateau, Edition 1939-40

Refer to geological map of United States.

Quincy, Wash.
Account for the "potholes" and give their correct physiographic name. What relation do they have to the Scablands? How do they prove large volume of water. (text pp. 257-261)

Moses, Lake, Wash.
Account for the "potholes". Over what width are these evidences of stream work? Does or does not this indicate width of the stream? What evidence is there of subsequent wind work? Does it account for the lake?

Beverly and Red Rock, Wash.
How does the topography show the structure of Saddle Mt? What other structure is suggested in places? What has altered the north face of the mountain? Name and describe some of the other features of the same origin. What is probable origin of course of Columbia River?

Bend, Oregon. (text pp. 268-271)
Account for the falls; for the buttes.

Malaga, Washington (Jour. Geol. 38, 385-396)
How does Bretz classify the 925 ft. terrace? Does Moses Coulee also contain a gravel fill? Locate Scabland opposite the coulee, also moraine on terrace and landslide topography. What does last resemble?

Summary should include in proper places brief discussions of (a) the "scabland controversy" and (b) the course of the rivers in the Yakima district as discussed in class. Letter on your map; (a) Scablands (b) Waterville Plateau (c) Palouse country (d) Moses Coulee (e) Grand Coulee (f) border glaciated area (G. S. A. 40, 648-649) See G. S. A. 49, 461-524 for latest discussion of scabland controversy.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory. Colorado Plateau, Edition 1939-40

Kaibab, Arizona - Model in Museum
Compare the origin of Vermillion and Shinarump Cliffs with that of the cliffs on the side of the Kaibab Plateau. Draw an east-west cross section with vertical scale not exaggerated more than four times to show their relation. Find and discuss explanations of "The Esplanade." Account for [illegible] course of west fork of Kanab Creek. (text pp.292-294) Show geology on cross section.

Bright Angle, Arizona.
Of what other map is this a resurvey? Read description on back. What are the depressions on the plateau surface? Account for the rapids in the river. Draw a cross section north from the station to north rim showing geology (see text for section and names, also model in museum). Account for the Tonto Platform. Note error in text section p. 289 in position of "U".

Mt. Trumbull, Arizona.
Account for Grand Wash Cliffs and Hurricane Ledge. (text pp. 279-280, 381) Account for the mountains and buttes on the plateau. What other physiographic province is shown?

Henry Mts., Utah (Model on 3rd floor)
Use a cross section to explain structure and origin of Mt. Ellsworth and Water Pocket fold. What is Navajo Mt? What evidence do you find of recent rejuvenation of the stream? (text pp. 311, 316, 322)

Flagstaff, Arizona. (text pp. 281-285)
Locate examples of (a) craters (b) sinkholes (c) cinder cones (d) cirque.

San Rafael, Utah. (text pp. 311, 317)
Explain structure of San Rafael Swell.

Summary should include diagrams showing each major step.

Letter on map (a) Grand Canyon (b) White Cliffs (c) Zuni Mts. (d) Vermillion Cliffs (e) Pink Cliffs (f) Henry Mts. (g) Black Mesa (h) Lees Feery (i) Grand Wash cliffs.
Include a discussion of alternative theories of drainage.

GEOLOGY 130

PHYSIOGRAPHY OF WESTERN UNITED STATES
Laboratory, Basin and Range, Edition 1939-40

Mexican Highland
Chisos Mountains, Texas
Account for Mariscal Mt. and for the parallel ranges to the northwest. How could you explain the course of the Rio Grande River through Mariscal Mt.? Account for the east-facing escarpment on the west side of Mariscal Mt. northwest of the name. Explain the open-spaced contours around the Chisos Mountains. (text pp. 390-392)
Playas, New Mexico
In what stage of the erosion cycle are these mountains? What evidence is there of block origin? What general term is suggested by the name of the "lake"? What term is applied to a basin containing such a lake?
Mt. Riley, New Mexico
Locate (a) block mountain, (b) volcanic cones. Account for the depressions in the southern part of the map giving more than one possible hypothesis.
Terlingua, Texas. See cross section of central U. S. by Kansas Geol. Soc. Describe and explain the Mesa de Anguila and suggest two possible explanations of the course of the Rio Grande across it. Account for the Solitario and classify the streams and their tributaries which rise within it.

Sacramento
Van Horn, Texas (text pp. 393-395)
Account for the Sierra-Diablo. Explain the course of Victoria Creek after it leaves the canyon. What changes have occured onthe Sierra Diablo and why? Account for Apache Canyon. Locate fault scarps in the eastern part of the map. (see A. A. P. G. 24, 144)

Great Basin
Toole Valley, Utah (text pp. 348-364)
To what class of mountains do these ranges belong? In what stage of erosion are they? Account for the flat areas.
Furnace Creek, Cal.- Nevada and Ballarat
What proofs are there that the basins between those mountains are of structural instead of erosional origin? Locate several possible fault scarps. What are the belts of brown stippling on the lower slopes of the mountains?

Salton Trough
Salton Sink, California (text pp. 377-379)
Account for the low level of the Salton Sea so close to tidewater. Account for the "ancient beach line".

Write summary of province as usual - include in proper places a brief discussion of (a) the controversy over the origin of "Basin Ranges" and (b) origin of pediments. Letter on map (a) Mohave Desert (b) Lake Bonneville shoreline (Map of glaciation) (c) Lake Lanontan shoreline (d) Tularosa Basin (e) Estancia Valley.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Sierras and Cascades, Edition of 1939-40

Sierras
Yosemite and Yosemite Valley, California-- See also maps in Prof. Paper 160 and model in museum.
Read the legend on the back of the Valley map. On the map pick out remnants of the several erosional levels, locating them definitely. Account for the differences between Yosemite Valley above and below Old Inspiration Point. Account for the angular outline of the Valley. Explain the falls in both Yosemite and Hotch Hotchy Valleys. Account for the "domes". How does the structu of the rock affect glacial erosion? What bearing has this on the problem of glacial erosion in general? (text pp. 409-418)

Mt. Lylo, California (see Jour. Geol. 47, 748-758)
What division of the Sierras is shown? What evidence does the map show of change in elevation of the land? Write a short explanation of the main topographic features of the map, but avoid duplicating what you have in summary what is origin of horseshoe-shaped valley around Reversed Peak?

Olancha, California (see Jour. Geology 44, 631-638)
Account for (a) upland meadows, (b) domes, (c) east side of Sierra Nevadas, (d) Kern Canyon

Cascades
Mt. Rainier and Mt. Rainier National Park, Washington (see Coombs Mt. Rainier National Park Bull. 3, Washington University, 1935.)
Read legend on back of Park map. Explain effect of glaciation on shape of the peak and of adjacent mountains. What was topography of the Cascades before Mt. Rainier was formed?

Crater Lake National Park, Oregon (text pp. 433-434)
Read legend on back of map. Outline the proofs which bear on the origin of the lake. What evidence shows that Mt. Mazama was glaciated? An alternative view of origin in advanced in G. S. A. 47; 1809-1830.

Mt. Hood and Vicinity, Oregon-Washington (see Geol. Soc. Am. 49, 831-930)
Discuss the origin of valley of the Columbia. What evidences isthere of a relatively recent uplift of this region? of landslides? What connection may latter have with origin of "scablands"?

Summary is usual. Discuss in proper places (a) hypotheses of origin of Columbia Valley in the mountains (b) peneplain problem in Cascades (c) structural relation of Cascades to Sierras (d) hanging valleys of Sierras (e) Origin of Crater Lake.
Letter on map (a) Mt. Shasta (b) Mt. Whitney (c) Glacier Peak (d) Lassen Peak (e) edge of continental drift (G. S. A. 40, 648)

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Pacific Coast Province, Edition 1939-40

Point Reyes, California (text pp. 481-493)
What is physiographic significance of (a) shape of shore at Point Reyes, (b) Drakes Estero, (c) shore line between Pt. Reyes and Tomales Point, (d) Tomales Bay, (e) course of Walker Creek, (f) Chileno Valley, (g) course of streams above Point Reyes Station, (h) 125 foot terrace in Drakes Bay, (i) bar on N side of Drakes Bay.

San Francisco, California. Folio 193
Account for San Francisco Bay - for the flat at Berkeley.

Marysville Buttes and Vicinity, California
Account for the Buttes, for Sutter Basin, for the valleys parallel to the edge of the Buttes NW of North Butte and W of West Butte. (text p. 473)

Compton, California. (see A. A. P. G. 11, 417, and 12, 515)
Account for the form of Dominguez Hills. How may drainage be used to locate anticlines in this vicinity? (text pp. 500-508)

San Antonio, California (text pp. 493-500)
Account for the topography of Mohave Desert. Describe what effects of faulting on topography you can find. See fault map of California and model on stairs.

La Jolla, California, (see Water Supply Paper 446) (maps) (text pp. 508-510)
What evidences can you find of recent changes in level of the land?

Coos Bay, Oregon. Folio 73 (text pp. 458-465)
Outline the evidences of changes of level and coastal outline shown in this map.

Summary.
Letter in your maps (a) Klamath Mts. (b) Oregon Coast Range (c) California Coast Range (d) boundaries of all subdivisions (e) Marysville Buttes (f) Olympic Mts. (g) San Gabriel Mts. (h) San Bernardino Mts. (i) San Andreas rift from fault map of California (j) limit of continental glaciation.
In summary discuss the probability of finding evidences of more than one cycle of erosionin the province, also evidence of present day mountain making.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Great Plains, laboratory, edition, 1938-39

High Plains
Camp Clarke, Nebraska, Folio 87.
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Account for the sand dunes. Why is erosion farther advanced here than it is farther east in the Great Plains?

Lakep, Kansas and geological map of Kansas. Folio 212.
What different kinds of depressions occur in south part of the map? Account for the streams which do not reach the Arkansas.

Raton Section
Raton, Brilliant, and Koehler Folio 214.
Read sections on "geography of the Great Plains province," Geology of the Great Plains and the Rocky Mts.," "topography," "drainage," and "geologic history" from post-Cretaceous uplift and erosion on. Tabulate briefly the steps in the development of the present topography since the formation of the Tertiary sediments.

Black Hills
Central Black Hills Folio 219.
Read "configuration of the Black Hills" p. 1, "geology of the general region," p, 2, and "early Tertiary mountain growth" through "Quaternary uplift and erosion," pp. 25-26. Draw an idealized east-west section (see section sheet) across the Black Hills labeling the formations which form hogback ridges. What is origin or physiographic name of (a) Citadel Rock, (b) Dakota Peak near Hermosa, (c) Robbers Roost, (d) Buffalo Gap, (e) French Creek E. of Custer, (f) South Fork of French Creek, (g) valley west of Jackson's Ranch NW of Custer, (h) Centennial Prairie, (i) valley between Sturgis and Whitewood, (j) Needles.

Pecos Section.
Tucumcari and geological map of New Mexico.
Account for the mesas. What evidence suggests that this area was once covered with Tertiary stream deposits? Why more eroded than farther east?

Missouri Plateau - glaciated.
Bismark, North Dakota (areal geology). Folio 181. Why does valley of Missouri narrow downstream? Why and when did the river assume its present course? (See Fenneman and note that the Folio gives another interpretation)

Missouri Plateau - unglaciated and glaciated.
Glendive, Mont. See glacial map of Montana.
Locate remnants of three terraces and find their age in reference to the drift. What effect did glaciation have on topography?

Edwards Plateau - Nueces folio, Texas No. 42
What evidence suggests a relatively recent uplift of this region?

Llano District
Llano - Burnet folio, Texas No. 183.
Read section on "General Geography and Geology," Geologic History," Account for the disregard of rock character shown by major streams. What causes the granite to be weaker than limestone? See Plate X.

Colorado Piedmont
Castle Rock. Folio, Colorado No. 198.
What past physiographic conditions do the Tertiary deposits indicate? What became of the latest Tertiary now found farther east? Explain.

Write a four page summary on outline given below.

Outline for report - give headings for each section.
Definition (be concise and to the point)
Boundaries (give geological, topographic features besides a list of adjoining provinces).
Geology (emphasis on kind rather than age of rocks).
Topography (include here discussion of subdivisions).
Physiographic history (start with oldest event which affects present surface. Separate conclusions from facts stated above).
Hand in reports in folders avoiding paper clips.

Do not forget to locate quadrangles and subdivisions of the province on your map and hand this in with the summary. Locate boundaries of all subdivisions. Locate also on map (a) Pine Ridge (b) Black Hills (c) Little Rocky Mts. (d) Sand dunes of Nebraska (e) Bearpaw Mts., (f) Highwood Mts., (g) Shonkin Sag, (h) Goshen Hole, (i) Llano Estacado, (j) limit of glaciations, (k) terminal moraine. (See fig. 27, p. 72, Fenneman)

Answers to questions above may be included in summary as examples. If you elect to do this the four page limit is not enforced.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Southern Rockies, Laboratory. Edition 1938-39

Livermore quadrangle, Colorado and geological map of Colorado
What evidence is here found that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Name the formation in the two hogbacks along the foot of the Range. Account for Table Mt. (Sec. 12, T11 N. r. 70 W.)

Leadville Sheet, Colorado
Account for the outlines of the ridges in Park Range. Why are these features best developed on the east side? Account for the smooth ridge tops. Locate examples of true hanging valleys; of terminal moraines.

Central City quadrangle, Colorado
Study to see if you can find evidence of more than one stage of peneplanation (low relief) of the mountain. Account for the lakes and their distribution including the step-like arrangement. Locate remnants of preglacial surface.

Canon City sheet, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow?

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region," "Geography," and "Geologic History," and examine the Illustration Sheets. What evidence of peneplanation of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II). What formations make hogbacks? Why are hogbacks not continuous along the foot of the mountain? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Sheridan, Wyoming. State geological map. See also G.S.A. 49; 1718-1721.
Draw a cross section with a vertical scale not less than 1600 feet to an inch from Ames Monument through E in O zone to letter T 13 N in east margin of map. Show geology. What does this show as to age of the upland? What is the slope in feet per mile? Is it a peneplain or a pediment?

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range, and the western part of the Great Plains showing (a) after post-Cretaceous uplift and erosion, (b) completion of High Plains deposits, (c) Pleistocene glaciation, and (d) present. See Fenneman p. 107. In the history include discussion of alternative theories as given in class.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Middle Rockies, and Wyoming Basin,
Edition of 1938-39
Consult Geological map of Wyoming for all Maps.

Meeteetse and Oregon Basin quadrangles, Wyoming. See G.S.A. 48, 813-894.
In what geographic feature are these quadrangles? Account for Little Buffalo Basin and for Spring Creek Basin. To what class of streams does Greybull River belong? Account for the course of Little Buffalo Creek. On the Oregon Basin quadrangle explain the ridges around Oregon Basin. Account for Elk Butte for the offsets in parts of the bordering ridge, for instance northeast of Loch Katrine and near B. M. 5311 in T. 50N., R. 100W. Suggest possible explanations for the enclosed part of the Oregon Basin around the lake. Account for the gently sloping crests of Meeteetse Rim.

Gallatin quadrangle, Wyoming. Folio No. 30.
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Account for Gallatin Range. To what province does it belong? Why are geysers and hot springs so common here?

Gilbert Peak quadrangle, Utah-Wyoming. See Prof. Paper 185, also Prof. Paper 61.
How is the structure of the Uinta Mountains shown in the remmants of the pre-glacial surface? What has been the effect of glaciation? Why was glacial erosion so much more effective on the south rather than on the north side of the range as is more common. Locate examples of the Gilbert Peak pediment; Bishop conglomerate; terminal moraines; Bear Mt. pediment; Browns Park formation; hogbacks.

Grand Teton quadrangle, Wyoming. (Jour. Geol. 43, 381-397; Fenneman p. 169)
Show the structure of the Teton mountains by a cross section through Jackson Lake across the quadrangle. In your summary explain two hypotheses of the origin of the mountains. What effects of glaciation can you distinguish.

Cloud Peak quadrangle, Wyoming. Folio No. 142
Explain effects of glaciation. Note especially the topography just east of Misty moon Lake. Locate several "flatirons" and account for them.

Rocks Springs, Wyoming.
Account for the north-south ridge east of Rock Springs using a sketch. Account for the intricate erosion of parts of Baxter Basin; for the lakes; for the gap east of Rock Springs.

Saddleback Hills, Wyoming.
Account for the hills giving a sketch of structure. Account for the curved ridges in Northeast corner; for the course of Little Medicine Bow River; for the ridge near Allen.

Walcott, Wyoming.
Account for the ridge northeast of Fort Steele using a sketch section about 5 miles long.
Write a summary of the province on same outline as before. Do not forget to give headings. Include summary of present interpretation of history of Uinta Mts., and history of Yellowstone Plateau.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Northern Rockies, Edition 1938-39

Map and aerial view of Glacier National Park and map of glacial deposits of Montana 24-40. (U. S. G. S. Bull. 600)
Compare the vigor of glaciation here with that of other areas thus far studied in the Rocky Mountains. Explanation? Account for the distribution of surviving glaciers. Locate several cirques, aretes (narrow divides), rock steps (explain) and "horns". Explain with a cross section the structure of the mountain front including Chief Mountain. Account for Chief Mountain.

Hamilton quadrangle, Montana-Idaho
Suggest possible explanations of (a) the straight border of the Bitterroot Mountains (b) straight courses of some of the streams within the mountains.

Saypo quadrangle, Montana
Illustrate with sections four (4) different possible structural interpretations of the origin of the hogbacks.

Rathdrum quadrangle, Idaho
Account for the lakes. Have you seen the same thing in the field? See New York State Museum Handbook No. 1 on Allegheny State Park (library) or Annals, Association American Geographers, vol. 10, pp. 114-117.

Philipsburg Folio, No. 196, Montana (library).
Read sections in Introduction of "Relief" and "Drainage"; "Topography," p. 2, "Tertiary and Quaternary systems," pp. 10-12; "Physiography," p. 21; "Physiographic development" and "Quaternary Period," p. 23. Account for Philipsburg Valley and its narrow outlet. Account for the present conditions at Georgetown Lake.

Write a summary of the province on outline previously given. This should include a discussion of (a) was there once a peneplain which is now dissected and (b) what relation do the Tertiary-filled valleys have to this surface?
Use diagrams where needed to save writing but refer to them in text.

Show on map (a) area of granitic rock (b) Rocky Mt. trench (c) Parcell Trench (d) Tertiary basins within mountains (see p. 220 and map of U. S.)

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Columbia Plateau, Edition 1938-39

Refer to geological map of United States.

Quincy, Wash.
Account for the "potholes" and give their correct physiographic name. What relation do they have to the Scablands? How do they prove large volume of water.

Moses Lake, Wash
Account for the "potholes". See text for correct designation. What evidence shows how wide the stream once was? What evidence is there of subsequent wind work? How does it account for the lake?

Beverly and Red Rock, Wash.
How does the topography show the structure of Saddle Mt? What other structure is suggested in places? What has altered the north face of the mountain? Name and describe some of the other features of the same origin. What is probable origin of course of Columbia River?

Bend, Oregon.
Account for the falls for the buttes.

Malaga Washington (Jour. Geol. 38, 385-396)
How does Bretz classify the 925 ft. terrace. Does Moses Coulee also contain a gravel fill? Locate Seabland opposite of the coulee, also moraine on terrace and landslide topography. What does last resemble?

Summary should include discussion of (a) the "seabland controversy" and (b) the course of the rivers in the Yakima district as discussed in class. Show on your map: (a) Scablands (b) Waterville Plateau (c) Palouse country (d) Moses Coulee (e) Grand Coulee.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory. Colorado Plateau, Edition ~~1937~~ 1938-39

Kaibab, Arizona

Compare the origin of Vermillion and Shinarump Cliffs with that of the cliffs on the side of the Kaibab Plateau. Draw an east--west cross section with vertical scale not exaggerated more than four times to show their relation. Find and discuss explanations of "The Esplanade." Account for course of west fork of Kanab Creek.

Bright Angle, Arizona.

Of what other map is this a resurvey? Read description on back. What are the depressions on the plateau surface? Account for the rapids in the river. Draw a cross section north from the station to north rim showing geology (see text for section and names, also model in museum). Account for the Tonto Platform.

Mt. Trumbull, Arizona.

Account for Grand Wash Cliffs and Hurricane Ledge. Account for the mountains and buttes on the plateau. What other physiographic province is shown?

Henry Mts., Utah (Model on 3rd floor)

Use a cross section to explain structure and origin of Mt. Ellsworth and Water Pocket fold. What is Navajo Mt? What evidence do you find of recent rejuvenation of the stream?

Flagstaff, Arizona

Locate examples of (a) craters (b) sinkholes (c) cinder cones (d) cirque.

San Rafael, Utah.

Explain structure of San Rafael Swell.

Summary should include diagrams showing each major step.

Locate on map (a) Grand Canyon (b) all subdiviisions of the province (c) White Cliffs (d) Zuni Mts (e) Vermillion Cliffs (f) Pink cliffs (g) Henry Mts. (h) Black Mesa (i) Lees Ferry (j) Grand Wash cliffs.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Basin and Range, Edition of 1938-39

Mexican Highland
Chisos Mountains, Texas
Account for Mariscal Mt. and for the parallel ranges to the northwest.
How could you explain the course of the Rio Grand River through Mariscal Mt.?
Account for the east-facing escarpment on the west side of Mariscal Mt., northwest of the name. Explain the open-spaced contours around the Chisos Mountains.
Playas, New Mexico
In what stage of the erosion cycle are these mountains? What evidence is there of block origin? What general term is suggested by the name of the "lake"? What term is applied to a basin containing such a lake.
Deming, New Mexico and geological map
Why does the geological map show no faults along the sides of these ranges?
Compare these mountains with those of Furnace Creek Region.
Mt. Riley, New Mexico
Locate (a) block mountain, (b) volcanic cones. Account for the depressions in the southern part of the map giving more than one possible hypothesis.
Terlingua, Texas. - See cross section of central U. S. by Kansas Geol. Soc.
Describe and explain the Mesa de Anguila and suggest two possible explanations of the course of the Rio Grande across it. Account for the Solitario and classify the streams and their tributaries which rise within it.

Scaramento
Van Horn, Texas
Account for the Sierra-Diablo. Explain the course of Victoria Creek after it leaves the canyon. What changes have occured on the Sierra Diablo and why?
Account for Apache Canyon. Locate fault scarps in the eastern part of the map.
What hypotheses might explain this enclosed basin in what is often called the "open basin region."

Great Basin
Toole Valley, Utah
To what class of mountains do these ranges belong? In what stage of erosion are they? Account for the flat areas.
Furnace Creek and Ballarat, Col.-Nevada
What proofs are there that the basins between those mountains are of structural instead of erosional origin? Locate several possible fault scarps. What are the belts of brown stippling on the lower slopes of the mountains?

Salton Trough
Salton, Sin, California
Account for the low level of the Salton Sea so close to tidewater. Account for the "ancient beach line".

Write Summary of province as usual - include a brief discussion of the controversy over the origin of "Basin Range" and discuss origin of pediments. Locate on map (a) Mohave Desert (b) Lake Bonneville shoreline (Map of glaciation) (c) Lake Labontan shoreline (d) Tularosa Basin (e) Estancia Valley

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Sierras and Cascades, Edition of 1938-39

Sierras. Yosemite and Yosemite Valley, California. See also maps in Prof. Paper 160 . Read the legned on the back of the Valley map. On the map pick out remnants of the several erosion levels, locating them definitely. Account for the differences between Yosemite Valley aove and below Old Inspiration Point. Account for the angular outline of the Valley. Explain the falls in both Yosemite and Hetch Hetchy Valleys. Account for the "domes". How does the structure of the rock affect glacial erosion? What bearing has this on the problem of glacial erosion in general.

Mt. Lylo, California
What division of the Sierras is shown? What evidence does the map show of change in elevation of the land? Write a short explanation of the main topographic features of the map but avoid duplicating what you have in summary.

Olancha, California See Jour. Geology 44., 631-38
Account for (a) upland meadows, (b) domes, (c) east side of Sierra Nevadas, (d) Kern Canyon

Kern Canyon Fault

Cascades
Mt. Rainier and Mt. Rainier National Plark, Washington. See Combs, Mt. Rainier Nat. Park, Bull. 3, Washington Univ. 1936. Read lengend on back of Park map. Explain effect of glaciation on shape of the peak and of adjacent mountains. What was topography of the Casendes before Mt. Rainier was formed?

ca

Crater Lake National Park, Oregon
Read legend on back of map. Outline the proofs in tabular form which demonstrate the method of origin of the lake. What evidence shows that Mt. Mazama was glaciated? What evidences of post glacial erosion do you find on the map? An alternative view of origin is advanced in G. S. A. 47:1809-1830.

Mt. Hood and Vicinity, Oregon-Washington SeeGeol. Soc. Am. 49, 831-930.
Discuss the origin of valley of the Columbia. What evidence is there of a relatively recent uplift of this region?

Summary as usual. Discuss in proper place (a) origin of Columbia Valley in the mountains (b) peneplain problem in Cascades (c) structural relation of Cascades to Sierras (e) glacial erosion of Sierras. Locate on map. (a) Mt. Shasta (b) Mt. Whitiney (c) Glacier Peak (d) Lassen Peak.

See JG. 47, 748-758, 1939
Horseshoe Valley

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Pacific Coast Province Edition ~~1936~~ 1938-39

Point Reyes, California

What is physiographic significance of (a) shape of shore at Point Reyes, (b) Drakes Estero, (c) shore line between Pt. Reyes and Tomales Point, (d) Tomales Bay, (e) course of Walker Creek, (f) Chileno Valley, (g) course of streams above Point Reyes Station, (h) 125 foot terrace in Drakes Bay, (i) bar on N side of Drakes Bay.

San Francisco, California, Folio 193
Account for San Francisco Bay - for the flat at Berkeley.

Marysville Buttes and Vicinity, California
Account for the Buttes, for Sutter Basin, for the valleys parallel to the edge of the Buttes NW of North Butte and W of West Butte.

Compton, California, See AAPG 11, 417, and 12, 515
Account for the form of Dominguez Hills

San Antonio, California
Account for the topography of Mohave Desert. Describe what effects of faulting on topography you can find.

La Jolla, California - See Water Supply Paper 446. (maps)
What evidences can you find of recent changes in level of the land?

Coos Bay, Oregon Folio 73
Outline the evidences of changes of level and coastal outline shown in this map.

Summary.
Show in your map (a) Klamath Mts. (b) Oregon Coast Range (c) California Coast Range (d) Boundaries of all subdivisions (e) Marysville Buttes (f) Olympic Mts. (g) San Gabriel Mts. (h) San Bernardino Mts. (i) San Andreas rift from fault map of California

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Ouachita Mts and Ozark Plateau. Edition 1937-38

Ouachita Mts.

Caddo Gap, Ark. What physiographic provinces shown on this map? Describe what Surface features show this boundary on the map. Refer to Bull. 808, pl. I What evidence indicates two cycles of erosion (fig. 7, Bull. 808)? Study structure sections in above and see if you can account for the bends in Caddo Mt. and for the structure of Nelson Mt.

Hot Springs and vicinity, top. and geological maps. Refer to Folio 215 What is the most resistant kind of rock here and how does this fact show in the topography? In folded rocks of diverse resistance the "dip slope" is smoother than the other slope which cuts across the layers. On this other side there often are minor terraces. Gaps across ridges narrow in the direction of dip. Try to apply these criteria to Trap Mt., West Mt., Sugarloaf Mt., and Indian Mt. What causes the difficulty? Does the rule that an anticline has a long gentle nose and a syncline a short nose apply here?

Winding Stair, Okla.

Account for the topography near Heavener by using the geological map.

Little Rock, Ark.

Read the legend on back. Find the border of the Coastal Plain. Account for differences in course of Arkansas River above and below Little Rock. What evidence suggests that the Coastal Plain sediments were deposited on a surface of very low relief? that the Coastal Plain once extended farther?

Ozark Plateau

Eureka-Harrison Folion No. 202.

Read sections on Geology and Geography of Ozark region, Topography, and Geologic History of Mesozoic and Cenozoic. Show by a cross section (structure section sheet) the three benches. Indicate the resistant rocks causing them and the names used in Missouri.

Coldwater, Mo.

Account for the mountains and compare with a similar area in Wisconsin. Refer to Mo. Geol. Survey vol. 10, pp. 94-109 for discussion of entrenced meaders. What explanations may apply here?

A map (use that in back of your text if desired, otherwise furnished) showing (a) province boundaries, (b) subdivisions, (c) quadrangles studied, and (d) special features called for is to be handed in with each report. Maps may be kept in Room 211 if desired. Color neatly and make a legend. For these provinces show (a) St. Francis Mts, (b) Mississippian escarpment, (c) Boston Mts, (d) Springfield Platform, (e) Salem Platform, (f) ~~Potosi~~ Escarpment (top of Cambrian ss), (g) Crystal Escarpment (top of St. Peter ss), (h) Athens Plateau

Besides notes on quadrangles include in your report a summary of not over four(4) pages using following outline. GIVE HEADINGS FOR EACH SECTION.

Definition of province (concise)

Boundaries (give geologic and topographic features besides a list of adjoining provinces and be brief)

Geology (emphasis on KIND rather than ageof rocks)

Topography (include discussion of subdivisions)

Physiographic History (startwitholdestevent whichaffectspresent surface. Separate CONCLUSIONS from facts stated above. Explain clearly andarrange in tabular form if desired).

Hand inreport in folder (avoid paper clips) Note dates in calendar for reports. THERE WILL BE NO EXTENSIONS OF TIME.

When attention is called to special subjects to be discussed in summary BE SURE they are PLACED IN PROPER SECTION. For Ozarks the main problem is the number of cycles of erosion. For Ouachitas the same plus possible causes of water and wind gaps. SEPARATE REORTS are needed for Ozark Plateaand Ouachita Mountains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Ouachitas, Ozarks, Edition 1936

Ouachitas
Gaddo Gap, Quadrangle, Arkansas, geological map of Arkansas, and U.S.G.S. Bull. 808 (library)
What physiographic provinces are present? How can you follow the boundary on the map? Describe differences on two sides. Account for the bends in Caddo Mt. and for the structure of Nelson Mt. Discuss evidence for and against two cycles of erosion in this area. See fig. 7, Bull, 808.

Hot Springs and vicinity, topographic and geological maps.
Work out the structure using the usual criteria for direction of dip, paying especial attention to Trap Mt., West Mt., Sugarloaf Mt. and Indian Mt. Then compare with geologic sections and account for some of the difficulties.

Winding Stair quadrangle, Oklahoma and geological map of Oklahoma.
What kind of structure is present west of Hoavoner? Explain how determined.

Ozarks
Eureka-Harrison Folio, No. 202. Read sections on geology and geography of the Ozark region, Topography, and geologic history os Mesozoic and Cenozoic. Account for the three benches drawing a rough sketch of them. What other explanation has beenapplied to them? Discuss.

Ouachitas
Little Rock quadrangle, Arkansas and geological map of Arkansas.
Read legend on back of map. Account for the differences in the course of Arkansas River above and below Little Rock. What evidence suggests that the coastal plain sediments once covered the entire area? What was topography of area when burial began?

Ozarks
Goldwater quadrangle, Missouri and geological map of Missouri.
Account for the "mountains". What area in Wisconsin resembles this in geological relations? Discuss possible explanations of the meandering course of St. Francis River.

Write summaries not to exceed four (4) pages in length, of each province on the following outline. (two provinces this time)

Definition of province
Summary of boundaries giving geological and topograpnic features which determine them (very brief statement)
Geology (brief with emphasis on kind rather than age of rocks)
Topography including any subdivisions of the province.
Physiographic history, the interpretation of the foregoing evidence (can often be arranged in tabular form) Be sure to deep inferences separate from observed facts stated in previous sections.

Hand in your work in a folder. Unless otherwise stated work on every province is due the day the next province is begun in class. Late work which in unexcused will receive no credit.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Ouachitas, Ozarks, etc.
Edition of 1934

Caddo Gap quadrangle, Arkansas and geological map of Arkansas
What physiographic provinces are present on this map? Pick out from the map of physiographic divisions of the U. S. the exact boundary and then see what differences in topography and drainage you can find between the two sides. Explain the peculiar bends in Caddo Mt. What geological term is applied to this kind of a structure? Account for the structure of Nelson Mt. Check your conclusion with maps in Bull. 808 in library. Explain two possible explanations of the rather level ridge tops.

Hot Springs and vicinity, topographic and geological maps.
How can you tell from the form of a ridge which way the strata dip? Apply these criteria to determine the structure of Trap Mt., West Mt., Sugarloaf Mt., and Indian Mt. Check your conclusions with the structure sections and explain the difficulties encountered in working out structure from topography on this map.

Winding Stair quadrangle and geological map of Oklahoma. Account for the curved ridges west of Heavener.

Eureka Springs-Harrison Folio No. 202. Read the parts on geography and geology of the Ozark region, topography and Mesozoic and Cenozoic geological history. Account for the three different summit levels and draw a sketch showing their relation to the geology using the structure sections as a guide. Discuss two possible explanations of these benches.

Little Rock quadrangle and geological map of Arkansas.
What evidence do you find of a former greater extent of the Coastal Plain in this area?

Coldwater quadrangle and geological map of Missouri.
What two classes of rocks are present here and how does each affect the topography? Do you know of any similar area, that is with similar history, in Wisconsin? Discuss two possible explanations of the meandering course of St. Francis River and their bearing on the physiographic history.

Show on your map of the U. S. the boundaries of the provinces studied and their subdivisions using color if possible. Do not use wax crayon. Other crayons may be rubbed in with cloth using gasoline if possible. Also show the outlines and names of the quadrangles studied. MAPS WILL BE GRADED ON NEATNESS. They are to be chekced up when each report is handed in.
Then write a summary, not to exceed four (4) pages in length, of the province (or provinces) covered by the exercise just before and follow this outline.

Definition of province
Brief description of what geological and topographic features fix its limits and those of its subdivisions.
Geology with emphasis on kind rather than age of formations.
Topography including a list of the different land forms in province.
Physiographic history, preferably in concise tabular form starting with the oldest events which affected the present surface.

Hand in report in a folder. Unless otherwise arranged for each report is due the day the next province is started in class. Unexcused late reports will be either reduced in grade or denied any credit at all. Grades depend upon originality, neatness, and conciseness.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Ouachitas, Ozarks, etc.

1933

Caddo Gap, Quadrangle, Arkansas, geological map of Arkansas, and U. S. G. S. Bull. 808.
What physiographic provinces are present? How can you follow the boundary on the map? Describe differences on two sides. Account for the bends in Caddo Mt. and for the structure of Nelson Mt. Liscuss evidence for two cycles of erosion in this area. See fig. 7, Bull. 808. What other physiographic province does this history suggest?

Hot Springs and vicinity, topographic and geological maps.
Try first to work out the structure using the cirteria employed in the Folded Appalachians paying especial attention to Trap Mt., West Mt., Sugarloaf Mt. and Indian Mt. What difficulties appear when you check with the geological map and how do you explain them?

Winding Stair quadrangle, Oklahoma and geological map of Oklahoma.
What kind of structure is present west of Heavener? Explain how worked out

Eureka-Harrison Folio, No. 202. Read sections on geography and geology of the Ozark region, Topogrpahy, and geologic history of Mesozoic and Cenozoic. Account for the three benches drawing a rough sketch of them. Contrast attitude of the authors with older explanations.

Little Rock quadrangle, Arkansas and geological map of Arkansas.
Read legend on back of map. Account for the differences in the course of Arkansas River above and below Little Rock. What evidence suggests that the coastal plain sediments once covered the entire area?

Coldwater quadrangle, Missouri and geological map of Missouri.
Account for the "mountains". What area in Wisconsin resembles this in geological relations? Discuss possible explantions of the course of St Francis River.

Write a summary, not to exceed four (4) pages in length, of the province on the following outline.

Definition of province
Summary of boundaries giving geological and topographic features which determine them (very brief statement)
Geology (brief with emphasis on kind rather than age of rocks)
Topography including any subdivisions of the province.
Physiographic history, the interpretation of the foregoing evidence (can often be arranged in tabular form) Be sure to keep inferences separate from observed facts stated in previous sections.

Hand in your work in a folder. Unless otherwise stated work on every province is due the day the next province is begun in class. Late work which is unexcused will receivene credit.

Special final

Geol 130

June 7 . 34

Regular June 12

avg 10		
1	5	4
2	7	31
3	11	44
4	13	51
5	31	61
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7	52	81
8	61	93
9	76	94
10	88	95
11	99	98

Terbilcox

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short 1

~~get Pierce to Sends maps~~

~~Soils of NW Wis.~~

get Chip Falls map

Chase map OK

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Chase 71

Guentzel 77

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Germany (10)

Stratigraphy 6.

The Mesozoics occur in the Bavarian Basin; under the Baltic Plain in the Silesian Basin and on the Bohemian Plateau. In the latter locality they are cont. Except in Bavaria ~~the~~ and where they have been modified by Tertiary volcanics. The Mesozoics & Cenozoics have gentle dips. ~~The Tertiary~~

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Ouachitas, Ozarks, etc.

1933

Caddo Gap, Quadrangle, Arkansas, geological map of Arkansas, and U. S. G. S. Bull. 808.
What physiographic provinces are present? How can you follow the boundary on the map? Describe differences on two sides. Account for the bends in Caddo Mt. and for the structure of Nelson Mt. Liscuss evidence for two cycles of erosion in this area. See fig. 7, Bull. 808. What other physiographic province does this history suggest?

Hot Springs and vicinity, topographic and geological maps.
Try first to work out the structure using the cirteria employed in the Folded Appalachians paying especial attention to Trap Mt., West Mt., Sugarloaf Mt. and Indian Mt. What difficulties appear when you check with the geological map and how do you explain them?

Winding Stair quadrangle, Oklahoma and geological map of Oklahoma.
What kind of structure is present west of Heavener? Explain how worked out

Eureka-Harrison Folio, No. 202. Read sections on geography and geology of the Ozark region, Topogrpahy, and geologic history of Mesozoic and Cenozoic. Account for the three benches drawing a rough sketch of them. Contrast attitude of the authors with older explanations.

Little Rock quadrangle, Arkansas and geological map of Arkansas.
Read legend on back of map. Account for the differences in the course of Arkansas River above and below Little Rock. What evidence suggests that the coastal plain sediments once covered the entire area?

Coldwater quadrangle, Missouri and geological map of Missouri.
Account for the "mountains". What area in Wisconsin resembles this in geological relations? Discuss possible explantions of the course of St Francis River.

Write a summary, not to exceed four (4) pages in length, of the province on the following outline.

Definition of province
Summary of boundaries giving geological and topographic features which determine them (very brief statement)
Geology (brief with emphasis on kind rather than age of rocks)
Topography including any subdivisions of the province.
Physiographic history, the interpretation of the foregoing evidence (can often be arranged in tabular form) Be sure to keep inferences separate from observed facts stated in previous sections.

Hand in your work in a folder. Unless otherwise stated work on every province is due the day the next province is begun in class. Late work which is unexcused will receive one credit.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Laboratory questions on Ozarks and Ouachitas

Caddo Gap quadrangle, Arkinsaw and geological map of Arkansas.
What physiographic provinces are represented on this quadrangle? What differences are there between them in rock structure, rock character, and drainage pattern? Account for the bends in Caddo Mountain west of the Gap. What name is applied to such structures? What kinds of rock make up the ridges? What is the structure of Nelson Mt.?

Hot Springs and vicinity, geological and topographic maps.
What is the structure of Trap Mt., West Mt., Sugarloaf Mt., Indian Mt.?
What difficulties do you find in applying same criteria as used in Pennsylvania? Explain fully.

Harrison quadrangle, Missouri-Arkansas and Eureka-Harrison Folio, No. 202
Read sections on geography and geology of the Ozark region, Topography, and geologic history of Mesozoic and Cenozoic. (Comment on attitude of authors as compared with that of older writers. Draw a generalized cross section from northeast to southwest of Harrison quadrangle showing geology and structure.) Name the three benches and account for each. What interpretation would have been given formerly? what interpretation do the writers of the folio give

Little Rock quadrangle, Arkansas (Camp Pike map), geological map of Arkansas
Read legend on back. Write a short summary of the physiography of the area contrasting the two physiographic provinces as to rock character, rock structure, drainage pattern, origin of lakes. Include the relation of Granite Mountain to the adjoining sediments.

Write a summary, not to exceed four pages in length of the province using the outline given.

Definition of province.
Summary of boundaries of province
Topography, including discussion of any subdivisions of province
Geology (very brief with little emphasis on age of rock)
History of the present topography, that is interpretation which should be avoided in preceeding sections. This is to keep inference separate from observed facts.
~~Relation of topography and natural resources, mentioned under geology. to life of man in this province.~~

Hand in along with direction sheet using either clip or manilla folder.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Great Plains, laboratory, edition, 1937-38

Camp Clarke, Nebraska and Folio 87
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Account for the sand dunes. Why is erosion farther advanced here than it is farther east in the Great Plains?

Laken quadrangle, Kansas and geological map of Kansas. Folio 212.
What different kinds of depressions occur in south part of the map? Account for the streams which do not reach the Arkansas.

Raton, Brilliant, and Koehler Folio 214.
Read sections on "geography of the Great Plains province", Geology of the Great Plains and the Rocky Mts.", "topography", "drainage", and "geologic history" from post-Cretaceous uplift and erosion on. Tabulate briefly the steps in the development of the present topography since the formation of the Tertiary sediments.

Central Black Hills Folio 219
Read "configuration of the Black Hills" p. 1, "geology of the general region", p. 2, and "early Tertiary mountain growth" through "Quaternary uplift and erosion", pp. 25-26. Draw an idealized east-west section (see section sheet) across the Black Hills labeling the formations which form hogback ridges. What is origin or physiographic name of (a) Citadel Rock, (b) Dakota Peak near Hermosa, (c) Robber Roost, (d) Buffalo Gap, (e) French Creek E. of Custer, (f) South Fork of French creek, (g) valley west of Jackson's Ranch NW of Custer, (h) Centennial Prairie, (i) valley between Sturgis and Whitewood, (j) Needles.

Spanish Peaks quadrangle and geological map of Colorado. Folio 71
Account for the Peaks and for the escarpment in northeast part of the map illustrating with a cross section.

Tucumcari quadrangle and geological map of New Mexico.
Account for the mesas. What evidence suggests that this area was once covered with Tertiary stream deposits?

Watrous quadrangle and geological map of New Mexico.
Compare with the Tucumcari quadrangle and note what other features are present. Account for Turkey Mountain and Masson Crater. Which was there first, the crater or the valley of Mora River? Cite evidence.

Bismark, North Dakota (areal geology).Folio 181. Why does valley of Missouri narrow downstream? Why and when did the river assume its present course? (See Fenneman and note that the Folio gives another interpretation)

Write a four page summary on outline previously given. Do not forget to locate quadrangles and subdivisions of the province on your map and hand this in with the summary by leaving on shelf in Room 211. Locate boundaries of all subdivisions. Locate also on map (a) Pine Ridge (b) Black Hills (c) Little Rocky Mts. (d) Sand dunes of Nebraska (e) Bearpaw Mts., (f) Highwood Mts., (g) Shonkin Sag, (h)Goshen Hole, (i) Llano Estacado, (j) limit of glaciations, (k) terminal moraine. (See fig. 27, p. 72, Fenneman)

Answers to questions above may be included in summary as examples. If you elect to do this the four page limit is not enforced.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Great Plains, laboratory, edition, 1936

Camp Clarke quadrangle and Folio 87 (library), Nebraska
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Account for the sand dunes.
Why is erosion farther advanced here than it is farther east in the Great Plains?

Lakin quadrangle, Kansas and geological map of Kansas
What different kinds of depressions occur in south part of the map. Account for the streams which do not reach the Arkansas.

Raton, Brilliant, and Koehler Folio No. 214.
Read sections on "geography of the Great Plains province", "Geology of the Great Plains and the Rocky Mts", "topography", "drainage", and "geologic history" from post-Cretaceous uplift and erosion on. Tabulate briefly the steps in the development of the present topography since the formation of the Tertiary sediments.

Central Black Hills Folio No. 219
Read "configuration of the Black Hills" p. 1, "geology of the general region", p. 2, and "early Tertiary mountain growth" through "Quaternary uplift and erosion", pp. 25-26. Draw an idealized east-west section (see section sheet) across the Black Hills labeling the formations which form hogback ridges. What is origin or physiographic name of (a) citadel Rock, (b) Dakota Peak near Hermosa, (c) Robbers Roost, (d) Buffalo Gap, (e) French Creek E. of Custer, (f) South Fork of French creek, (g) valley west of Jackson's Ranch NW of Custer, (h) Centennial Prairie, (i) valley between Sturgis and Whitewood, (j) Needles.

Spanish Peaks quadrangle and geological map of Colorado.
Account for the Peaks and for the escarpment in northeast part of the map illustrating with a cross section.

Tucumcari quadrangle and geological map of New Mexico.
Account for the mesas. Was this area once covered with Tertiary stream deposits? Outline evidence on this question considering the course of Pajarito Creek west of Tucumcari.

Watrous quadrangle and geological map of New Mexico.
Compare with the Tucumcari quadrangle and note what other features are present. Account for Turkey Mountain and Masson Crater. Which was there first, the crater or the valley of Mora River? Cite evidence.

Bismark, North Dakota (areal geology). Why does valley of Missouri narrow downstream? Why and when did the river assume its present course? (See text.)

Write a four page summary on outline previously given. Do not forget to locate quadrangles and subdivisions of the province on your map and hand this in with the summary.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Great Plains, laboratory, edition, 1933

Camp Clarke quadrangle and Folio 87 (library), Nebraska
Read the section on geologic history of the central Great Plains region from last paragraph on p. 3 on. In what subdivision of the Great Plains is this map? Account for the springs in the south part of the map and for the sand dunes. Accout for Courthouse and Jail Rocks. Why is erosion farther advanced here than it is farther east in the Great Plains?

Lakin quadrangle, Kansas and geological map of Kansas
Suggest possible origins of the depressions in south part of the map and for the "lost streams".

Ogallala quadrangle, Nebraska and map of soil regions of Nebraska 23-25
Account for the enclosed basins. Discuss explanations of the difference between North and South Platte Rivers including the question of stream aggradation.

Raton, Brilliant, and Koehler Folio No. 214.
Read sections on "geography of the Great Plains province", "Geology of the Great Plains and the Rocky Mts","topography", "drainage", and "geologic history" from post-Cretaceous uplift and erosion on. Tabulate briefly the steps in the development of the present topography since the formation of the Tertiary sediments.

Central Black Hills Folio No. 219
Read" configuration of the Black Hills" p. 1, "geology of the general region" p. 2, and "early Tertiary mountain growth" through "Quaternary uplift and erosion", pp. 25-26. Draw an idealized east-west section (see section sheet) across the Black Hills labling the formations which form ridges. Locate typical examples of (a) hogback, (b) laccolithic dome, (c) superimposed stream, (d) consequent stream, (e) watergap, (f) dissected alluvial cone, (g) obsequent valley, (h) "flatiron" (tribanglular hill of tilted sediments).

Spanish Peaks quadrangle and geological map of Colorado.
Account for the Peaks and for the escarpment in northeast part of the map illustrating with a diagrametic cross section.

Tucumcari quadrangle and geological map of New Mexico.
Account for themesas. Was this area once covered withTertiary stream deposits? Outline evidence on this question considering the course of Pajarito Creek west of Tucumcari.

Watrous quadrangle and geological map of New Mexico.
Compare with the Tucumcari quadrangle and note what other featuresare present. Account for Turkey Mountain and Masson Crater. What is time relation of the latter to formation of valley of Mora River.

Write a four page summary on outline previously given. Do not forget to locate quadrangles and subdivisions of the province on your map and hand this in with the summary.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Laboratory questions on Great Plains

Camp Clarke quadrangle and Folio 87, Nebraska
Read the section "Brief geologic history of the central Great Plains region" beginning at last paragraph on p. 3. In what subdivision of the Great Plains is this map situated? Account for the springs in the south part of the map. Account for the sand dunes considering that the prevailing summer winds at present are SW. Explain the origin of Courthouse and Jail Rocks. What are the canals for? Why is erosion more advanced here than farther east in the central Great Plains?

Meeteetse and Oregon Basin quadrangles, Wyoming and geological map of Wyoming
In what geographic feature are these quadrangles? Is this considered a part of the Great Plains by everyone? Why can it be included? Account for Little Buffalo Basin and Spring Creek Basin. Account for the ridge in east part of T. 47 N., R. 101 W. and for the circular lowland in west part of T. 47 N., R. 100 W. Draw a cross section to show geology and structure from about 1½ miles north of Sunshine directly east across the map. The Mesaverde formation is largely sandstone. To what class of streams does Greybull River belong? Account for the course of Little Buffalo Creek. On the Oregon Basin map explain the ridges around Oregon Basin. Account for Elk Butte and for the offsets in parts of the bordering ridge for instance northeast of Loch Katrine and near B. M. 5311 in T. 50 N., R. 100 W. Suggest possible explanation for the enclosed part of the Oregon Basin around the lake. Account for the gently sloping crests of Meeteetse Rim.

Syracuse (geological) and Lakin quadrangles, Kansas
What is the orign of the Tertiary deposits? What has caused their erosion? Suggext possible explanations of the enclosed depressions. Account for the distribution of sand dunes. Account for Lake McKinney.

Ogalalla quadrangle, Nebraska
Account for the basins of the north and extreme south parts. Suggest possible reasons for the difference between North and South Platte Rivers.

Raton, Brilliant, and Koehler Folio, No. 214
Read sections on "geography of the Great Plains Province", "Geology of the Great Plains and the Rocky Mountains", "Topography", "Drainage", and "Geologic History" from "Post Cretaceous uplift and erosion" on. Make a brief tabulation of the steps in the development of the present topography since the formation of the Tertiary sediments. What is the origin of the lakes of the Koehler quadrangle?

Central Black Hills Folio No. 219
Read "Configuration of the Black Hills", p. 1, "Geology of the general region", p. 2, and "Early Tertiary mountain growth" through "Quaternary uplift and erosion", pp. 25-26. Draw an idealized E-W section across the Black Hills labling the formations which form ridges. Account for difference between west and east sides. Locate typical examples of hogback, laccolith dome, cave in limestone, watergap, consequent stream, dissected alluvial cone, obsequent valley, superimposed stream, "flatiron" or triangular area of sediments overlying crystallines.

Write a summary of the province on same outline as used previously

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Southern Rockies, Laboratory. Edition 1938-39

Livermore quadrangle, Colorado and geological map of Colorado
What evidence is here found that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Name the formation in the two hogbacks along the foot of the Range. Account for Table Mt. (Sec. 12, T11 N. r. 70 W.)

Leadville Sheet, Colorado
Account for the outlines of the ridges in Park Range. Why are these features best developed on the east side? Account for the smooth ridge tops. Locate examples of true hanging valleys; of terminal moraines.

Central City quadrangle, Colorado
Study to see if you can find evidence of more than one stage of peneplanation (low relief) of the mountain. Account for the lakes and their distribution including the step-like arrangement. Locate remnants of preglacial surface.

Canon City sheet, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow?

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region," "Geography," and "Geologic History," and examine the Illustration Sheets. What evidence of peneplanation of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II). What formations make hogbacks? Why are hogbacks not continuous along the foot of the mountain? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Sheridan, Wyoming. State geological map. See also G.S.A. 49; 1718-1721.
Draw a cross section with a vertical scale not less than 1600 feet to an inch from Ames Monument through E in O zone to letter T 13 N in east margin of map. Show geology. What does this show as to age of the upland? What is the slope in feet per mile? Is it a peneplain or a pediment?

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range, and the western part of the Great Plains showing (a) after post-Cretaceous uplift and erosion, (b) completion of High Plains deposits, (c) Pleistocene glaciation, and (d) present. See Fenneman p. 107. In the history include discussion of alternative theories as given in class.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Southern Rockies, Laboratory. Edition 1937

Livermore quadrangle, Colorado and geological map of Colorado
What evidence is here found that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Name the foundation in the two hogbacks along the foot of the Range. Account for Table Mt. (Sec. 12, T11 N. R. 70 W.)

Leadville Sheet, Colorado
Account for the outlines of the ridges in Park Range. Why are these features best developed on the east side? Account for the smooth ridge tops. Locate examples of true hanging valleys; of terminal moraines.

Central City quadrangle, Colorado
Study to see if you can find evidence of more than one stage of peneplanation (low relief) of the mountains. Account for the lakes and their distribution including the step-like arrangement. Locate remnants of preglacial surface.

Canon City sheet, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow?

Castle Rock Folio, Colorado (No. 198)
Read sections "Geography of the region", "Topography", "Geologic History," examine Illustration sheets. Note the even crests of the Mountains (Plates I, II). What significance do they have in the erosional history of the region? What relation have they to the Tertiary deposits of the Great Plains? What happened in this area during the Pleistocene? (Plates XIX, XX) Account for the hogbacks of Perry Park (Plates XII, XIII, XIV). Account for the high isolated buttes on the Plains.

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region," "Geography," and "Geologic History," and examine the Illustration Sheets. What evidence of peneplanation of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II) What formations make hogbacks? Why are hogbacks not continuous along the foot of the mountains? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range, and the western part of the Great Plains showing (a) after post-Cretaceous uplift and erosion, (b) completion of High Plains deposits, (c) Pleistocene glaciation, and (d) present. See Fenneman p. 107. If desired the answers to the above questions may be incorporated in the summary as examples. In the history include discussion of alternative theories as given in class.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Southern Rockies, Laboratory

Livermore quadrangle, Colorado and geological map of Colorado
What physiographic provinces are shown on this map? Draw a generalized geologic section on South line of T. 9 N. to show topographical and geological relations of the two provinces. What evidence is there that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Account for the two hogbacks along the foot of the Range. Account for Table Mountain in Sec. 12, T. 11 N., R. 70 W. Show by a cross section its relation to the hogback to the east.

Leadville Sheet, Colorado
Account for the peculiar outlines of the ridges of Park Range. What are the valleys on the east side? Why better developed than on the west side? Where may remnants of the preglacial surface be found? Locate examples of true hanging valleys, of terminal moraines. Note the engineering of the Colorado Midland R. R. west of Arkansas Jct. and describe the physiographic features it passes through in this distance.

Central City quadrangle, Colorado.
Study to see if you can find evidence of more than one stage of peneplanation or low relief of the mountains. Account for the lakes and their distribution. Locate remnants of preglacial surface. Account for the step-like arrangement of some lakes. Suggest reason for dense settlement of parts of the area. Examine the curves by which the railroad formerly surmounted the Continental Divide; this portion has now been abandoned in favor of the Moffat Tunnel which passes under the region of James Peak and which also brings water to Denver.

Boulder quadrangle, Colorado
Note the old topography of the crest of the Range in contrast with the narrow valleys below. Account for the long ridges along the foot of the Range and for the triangular shapes of some of the shorter sections of them.

Canon City sheet, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow? Describe fully what has happened since then. What is the cause of the gentle slopes in far southwestern part of the map? Comment on the glacial features of the Wet Mountains and explain.

Rocky Mountain National Park map, Colorado
What has been the effect of glacial erosion? of glacial deposition? Locate specific examples of both. Draw a projected profile of the south half of T. 4 N. Discuss conclusion as to stages in the erosional history of the Range. Use vertical scale not exaggerated more than twice.

Grand Hogback quadrangle, Colorado and geological map of Colorado
What formation is responsible for the Grand Hogback? For the hogbacks to northeast and to south? What two physiographic provinces are shown? Suggest origin of the name Burning Mountain. What is the origin of Harvey Gap?

Castle Rock Folio, Colorado (No. 198)
Read sections "Geography of the region", "Topography", "Geologic History", examine Illustration sheets. Note the even crests of the Mountains (Plates I, II). What significance do they have in the erosional history of the region? What relation have they to the Tertiary deposits of the Great Plains? What happened in this area during the Pleistocene? (Plates XIX, XX) Account for the hogbacks of Perry Park (Plates XII, XIII, XIV). Account for the high isolated buttes on the Plains.

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region", "Geography", and "Geologic History", and examine the Illustration sheets. What evidence of peneplantion of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II) What formations make hogbacks? Why are hogbacks not continuous along ghe foot of the mountains? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range and the western part of the Great Plains showing (a) conditions before Cambrian, (b) after deposition of the marine and other Paleozoic and Cretaceous sediments, (c) after post-Cretaceous uplift, (d) time of formation of High Plains gravels, (e) Pleistocene glaciation, and (f) present.

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PHYSIOGRAPHY OF THE UNITED STATES
Southern Rockies, Laboratory

newer edition 1933?

Livermore quadrangle, Colorado and geological map of Colorado
What physiographic provinces are shown on this map? What evidence is there that the Front Range was once of lower relief than at present? Account for the broad valleys in the north central part of the Range and for the course of the North Fork of Cache la Poudre River. Account for the two hogbacks along the foot of the Range.

Leadville Sheet, Colorado
Account for the peculiar outlines of the ridges of Park Range. What are the valleys on the east side? Why better developed than on the west side? Where may remnants of the preglacial surface be found? Locate examples of true hanging valleys; of terminal moraines.

Central City quadrangle, Colorado
Study to see if you can find evidence of more than one stage of peneplanation (low relief) of the mountains. Account for the lakes and their distribution. Locate remnants of preglacial surface. Account for the step-like arrangement of some lakes.

Canon City sheet, Colorado and geological map of Colorado
Account for the marked hogback north of Canon City and for its termination to the southwest; also for the hogback northeast of Canon City. Account for Webster Park and for the Royal Gorge. What must have been the topography when the Arkansas River first began to flow? Describe fully what has happened since then.

Castle Rock Folio, Colorado (No. 198)
Read sections "Geography of the region", "Topography", "Geologic History", examine Illustration sheets. Note the even crests of the Mountains (Plates I, II). What significance do they have in the erosional history of the region? What relation have they to the Tertiary deposits of the Great Plains? What happened in this area during the Pleistocene? (Plates XIX, XX) Account for the hogbacks of Perry Park (Plates XII, XIII, XIV). Account for the high isolated buttes on the Plains.

Colorado Springs Folio, Colorado (No. 203)
Read sections "Geography and geology of the region", "Geography", and "Geologic History", and examine the Illustration Sheets. What evidence of peneplanation of the mountains may be seen? Discuss the question of one peneplain displaced by a fault or two peneplains. (See Fig. 8 and Plates I, II) What formations make hogbacks? Why are hogbacks not continuous along the foot of the mountains? What effect has glacial erosion had on the scenic features of the mountains? Locate features due to glacial deposition.

Summary
Write a summary on outline previously used. Include in this a series of ideal cross sections of the Front Range, and the western part of the Great Plains showing (a) after post-Cretaceous uplift and erosion, (b) time of formation of High Plains gravels, (c) time of Pleistocene glaciation, and (d) present.

Extra questions, Southern Rockies, 1938

Sherman, Wyoming

Draw a cross section with a vertical scale not less than 1600 feet to an inch from Ames Monument through e in o zone to letter T 13 N in east margin of map. Show geology from state map. What evidence does this show as to age of the upland? What is the slope of their surface in feet per mile? Is it a peneplain or a pediment?

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Middle Rockies, including Wyoming Basin. Edition of 1937-38
Consult geological map of Wyoming for all maps.

Meeteese and Oregon Basin quadrangles, Wyoming.
In what geographic feature are these quadrangles? Account for Little Buffalo Basin and for Spring Creek Basin. To what class of streams does Greybull River belong? Account for the course of Little Buffalo Creek. On the Oregon Basin quadrangle explain the ridges around Oregon Basin. Account for Elk Butte and for the offsets in parts of the bordering ridge, for instance northeast of Loch Katrine and near B.M. 5311 in T. 50 N., R. 100 W. Suggest possible explanations for the enclosed part of the Oregon Basin around the lake. Account for the gently sloping crests of Meeteetse Rim. (See also G.S.A. 48, 813-894).

Gallatin quadrangle, Wyoming. Folio 30.
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Account for Gallatin Range. To what province does it belong? Why are geysers and hot springs so common here?

Gilbert Peak quadrangle, Utah-Wyoming. See Prof. Paper 185, also Prof. Paper 61. How is the structure of the Uinta Mountains shown in the remnants of the preglacial surface? What has been the effect of glaciation? Why was glacial erosion so much more effective on the south rather than on the north side of the range as is more common? Locate examples of the Gilbert Peak pediment; Bishop conglomerate; terminal moraines; Bear Mt. pediment; Browns Park formation; hogbacks.

Grand Teton quadrangle, Wyoming.
Show the structure of the Teton mountains by a cross section through Jackson Lake across the quadrangle. In your summary explain two hypotheses of the origin of the mountains. What effects of glaciation can you distinguish? (See Journal of Geology, vol. 43, pp. 381-397, 1935. Also Fenneman p. 169).

Cloud Peak quadrangle, Wyoming.
Explain effects of glaciation. Note especially the topography just east of Misty moon Lake. Locate several "flatirons" and account for them.

Rock Springs, Wyoming.
Account for the north-south ridge east of Rock Springs using a sketch. Account for the intricate erosion forms of parts of Baxter Basin; for the lakes; for the gap east of Rock Springs.

Saddleback Hills, Wyoming.
Account for the hills giving a sketch of structure. Account for the curved ridges in northeast corner; for the course of Little Medicine Bow River; for the ridges near Allen.

Walcott, Wyoming.
Account for the ridge northeast of Fort Steele using sketch of a section about 5 miles long.

Write a summary of the area on same outline as before. So not forget to give headings. Include summary of present interpretation of history of Uinta Mts. and history of Yellowstone Plateau.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Middle Rockies

Meeteese and Oregon Basin quadrangles, Wyoming, and geological map of Wyoming. In what geographic feature are these quadrangles? Account for Little Buffalo Basin and for Spring Creek Basin. To what class of streams does Greybull River belong? Account forthe course of Little Buffalo Creek. On the Oregon Basin quadrangle explain the ridges around Oregon Basin. Account for Elk Butte and for the offsets in parts of the bordering ridge, for instance northeast of Loch Katrine and near B. M. 5311 in T. 50 N., R. 100 W. Suggest possible explanations for the enclosed part of the Oregon Basin around the lake. Account for the gently sloping crests of Meeteetse Rim.

Map of Yellowstone National Park and geological map of Wyoming.
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Outline the physiographic history of the region since the formation of these rocks. What does the shape of Yellowstone Lake suggest as to its origin? Name three different processes which might have blocked the former outlet. Lake deposits, which are not shown on the geological map, occur around the lake up to elevation 7900. Allowing for probable inaccurate mapping this must have caused the outlet of the lake via Outlet Creek to Snake River. What is origin of Outlet Lake? Find where the 7900 foot contour comes closest to the river north of the Yellowstone Lake. Why did this outlet replace the one to the southwest? Account for the hanging tributaries along the Grand Canyon of the Yellowstone. Contrast the origin of Mt. Washburn with that of the mountains in the northwest and eastern parts of the Park. Why are geysers and hot springs so common here?

Gilbert Peak quadrangle, Utah-Wyoming
How is the structure of the Uinta Mountains shown in the remnants of the preglacial surface? What has been the effect of glaciation? Why was glacial erosion so much more effective on the south rather than on the north side of the range as is more common. See Prof. Paper 61 in library.

Write a summary of the province on same outline as before. Do not forget to give headings.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Middle Rockies, Edition of 1937

Consult geological map of Wyoming for all maps.

Meeteese and Oregon Basin quadrangles, Wyoming.
In what geographic feature are these quadrangles? Account for Little Buffalo Basin and for Spring Creek Basin. To what class of streams does Greybull River belong? Account for the course of Little Buffalo Creek. On the Oregon Basin quadrangle explain the ridges around Oregon Basin. Account for Elk Butte and for the offsets in parts of the bordering ridge, for instance northeast of Lock Katrine and near B. M. 5311 in T. 50 N., R. 100 W. Suggest possible explanations for the enclosed part of the Oregon Basin around the lake. Account for the gently sloping crests of Meeteetse Rim.

Gallatin quadrangle, Wyoming. See also Folio 30.
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Account for Gallatin Range. To what province does it belong? Outline the physiographic history of the region since the formation of the volcanoes. Why are geysers and hot springs so common here?

Gilbert Peak quadrangle, Utah-Wyoming. See Prof. Paper 165, also Prof. Paper 61.
How is the structure of the Uinta Mountains shown in the remnants of the preglacial surface? What has been the effect of glaciation? Why was glacial erosion so much more effective on the south rather than on the north side of the range as is more common. Locate examples of the Gilbert Peak pediment; Bishop conglomerate; terminal moraines; Bear Mt. pediment; Browns Park formation; hogbacks.

Grand Teton quadrangle, Wyoming.
Show the structure of the Teton mountains by a cross section through Jackson Lake across the quadrangle. In your summary explain two hypotheses of the origin of the mountains. What effects of glaciation can you distinguish. (See Journal of Geology, vol 43, pp. 381-397, 1935).

Cloud Peak quadrangle, Wyoming.
Explain effects of glaciation. Note especially the topography just east of Misty moon Lake. Locate several flatirons and account for them.

Write a summary of the province on same outline as before. Do not forget to give headings. Include summary of present interpretation of history of Uinta Mts.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Northern Rockies, Edition 1938

Map and aerial view of Glacier National Park and map of glacial deposits of Montana 24-40. (Consult U. S. G. S. Bull. 600 in library). Compare the vigor of glaciation here with that of other areas thus far studied in the Rocky Mountains. Explanation? Account for the distribution of surviving glaciers. Locate several cirques, aretes (narrow divides), rock steps (explain) and "horns". Explain with a cross section the structure of the mountain front including Chief Mountain.

Hamilton quadrangle, Montana-Idaho
Suggest possible explanations of (a) the straight border of the Bitterroot Mountains, (b) straight courses of some of the streams within the mountains.

Saypo quadrangle, Montana
Illustrate with sections four (4) different possible structural interpretations of the origin of the hogbacks. See Geol. Soc. America 40, pp. 427-456.

Rathdrum quadrangle, Idaho
Account for the lakes. Have you seen the same thing in the field? If so, where? See Annals Association American Geographers, 10, pp. 114-117 or Outline of Glacial Geology, pp. 44 and 58.

Philipsburg Folio, No. 196, Montana (library).
Read sections in Introduction of "Relief" and "Drainage"; "Topography," p. 2, "Tertiary and Quaternary systems," pp. 10-12; "Physiography," p. 21; "Physiographic development" and "Quaternary Period," p. 23. Account for Philipsburg Valley and its narrow outlet. Account for the present conditions at Georgetown Lake.

Write a summary of the province on outline previously given. This should include in proper place a brief discussion of (a) was there once a peneplain which is now dissected and (b) what relation do the Tertiary-filled valleys have to this surface? Use diagrams where needed to save writing but refer to them in your text.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Northern Rockies Edition 1937

Map and aerial view of Glacier National Park and map of glacial deposits of Montana 24-40. (Consult U. S. G. S. Bull. 600 in library).

Compare the vigor of glaciation here with that of other areas thus far studied in the Rocky Mountains. Explanation? Account for the distribution of surviving glaciers. Locate several cirques, aretes (narrow divides), rock steps (explain) and "horns". Explain with a cross section the structure of the mountain front including Chief Mountain. Account for Chief Mountain.

Hamilton quadrangle, Montana-Idaho
Suggest possible explanations of (a) the straight border of the Bitterrot Mountains, (b) straight courses of some of the streams within the mountains.

Saypo quadrangle, Montana
Illustrate with sections four (4) different possible structural interpretations of the origin of the hogbacks.

Rathdrum quadrangle, Idaho
Account for the lakes. Have you seen the same thing in the field? See New York State Museum Handbook No. 1 on Allegheny State Park (library) or Annale Association American geographers vol. 10, pp. 114-117.

Philipsburg Folio, No. 196, Montana (library).
Read sections in Introduction of "Relief" and "Drainage"; "Topography," p. 2, "Tertiary and Quaternary systems," pp. 10-12; "Physiography," p. 21; "Physiographic development" and "Quaternary Period," p. 23. Account for Philipsburg Valley and its narrow outlet. Account for the present conditions at Georgetown Lake.

Write a summary of the province on outline previously given. This should include a discussion of (a) was there once a peneplain which is now dissected and (b) what relation do the Tertiary-filled valleys have to this surface? Use diagrams where needed to save writing but refer to them in text.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Northern Rockies

Do not forget that every province is to be outlined on your physiographic diagram and that every quadrangle or other map is to be shown.

Cloud Peak-Ft. McKinney folio, No. 14?
Read sections "Introduction" as far as "Geology" on p. 2; "Quaternary system", p. 9 as far as "Structural geology" on p. 12; "Geologic History", parts on Tertiary and Quaternary only. (The "reformed spelling" used in this publication was ordered by Roosevelt and used in Government publications for only a few months until forbidden by Congress.) Study this range to see to what extent its physiographic history was the same as that of the Front Range of Colorado. Search for remnants of two peneplains the younger of which is of the same age as the gravels of the High Plains. Draw a series of diagramatic sections to illustrate the history of the Bighorns from the first uplift of the dome to the present. With each section explain the steps in the history of the topography which it shows. Not all the steps are discussed in the text of the folio. Study also the Illustration pages. In Figs. 7 and 8 account for the shapes of the higher steep-sided mountains. Can you find remnants of the preglacial surface in these and other figures? Explain. In Fig. 9 what does this picture tell of the formation of cirques at different levels separated by rock steps? Fig. 17 illustrates the formation of hogbacks. Study Fig. 21 in connection with the history of the range.

Map and aerial view of Glacier National Park.
Compare the vigor of glaciation here with that of other areas in the Rocky Mountains thus far studied. Compare the number of surviving glaciers and account for their distribution. Iceberg Lake is in an excellent example of a cirque. Locate definitely five others which are as good. Gould and Citadel Mountains are typical "Alpine Peaks" between cirques; locate five others which are as good. The stream which runs east from Reynolds Mountain is in a typical hanging valley; Locate three others. The Garden Wall is a typical "arrete" or divide narrowed by glaciation; locate three others. Snyder Creek, east of the North end of Lake McDonald has a good "rock step" near the head of its valley. Locate another example. Locate remanants of the preglacial upland. What is the structural relation of the rocks of the Mountains to those of the plains? Account for Chief Mountain. Account for the elongated lakes. How far did glaciation extend onto the Great Plains? Explain. What is the cause of the narrows in St. Mary Lake?

Hamilton quadrangle, Montana-Idaho
Suggest possible explation of (a) straight border of Bitterroot Mountains, (b) straight courses of some of the streams in them. What signs of glaciation do you find? Suggest origin of flat floor of Bitterroot valley.

Sawtooth quadrangle, Idaho
This map shows a protion of the crystalline rock region. Can you find evidence of more than one cycle of erosion? Suggest origin of the name of the mountains. What is the drainage pattern? What effects of glaciation do you find?

Nyack quadrangle, Montana
What topographic features suggest that these mountains consist of folded sedimentary rocks? What is the drainage pattern? Which side of the ranges was more altered by glaciation and why? Locate typical examples of (a) U.shaped valley, (b) hanging valley, (c) glaciated non-hanging valley, (d) cirque, (e) cirque with rock step below, (f) non-glaciated valley, (g) outwash terrace

Map of Yellowstone National Park and geological map of Wyoming
Study the geological map to find the origin of the relatively level parts of the Park, the Plateaus. Outline the physiographic history of the region sine the formation of these rocks. What does the shape of Yellowstone Lake suggest as to its origin? Name three different processes which might have blocked the outlet. Lake deposits (not shown on geological map) occur around the lake up to 7900 elevation. Allowing for probable inaccurate mapping this must have caused the outlet of the lake to have been via Outlet Creek to Snake River. Suggest the origin of Outlet Lake. Find where the 7900 foot contour comes closest to the River north of the Lake. Why did this outlet supplant the older one? Account for the hanging tributary valleys along the "Grand Canyon". Locate canyons similar in development to that of the Yellowstone. Suggest possible causes of the Yellowstone falls. Contrast origin of Mt. Washburn with that of peaks in Northwest and East parts of the Park. Why are geysers and hot springs so common here? Explain why a geyser erupts periodically.

Philipsburg Folio, No. 196.
Note: only one copy in the laboratory; another is in the library on 2nd floor
Read sections in Introduction on "Relief" and "Drainage."; "Topography", p. 2; "Tertiary and Quaternary systems", pp. 10-11; "Physiography", p. 21; "Physiographic development" and "Quaternary Period", p. 23. Account for Phillipsburg valley and its narrow outlet. Account for the present conditons at Georgetown Lake. Try to find remnants of the "peneplain" and discuss the evidence on which its presence was based. Study the cirques, to see if there is any consistent relation between their perfection of form and the character of the rock in which they were excavated.

✓ Gilbert Peak quadrangle, Utah-Wyoming
How is the structure of the Uinta Mountains shown in the remnants of the preglacial surface? What has been the effect of glaciation? Locate true hanging valleys and compare them with large cirques on the side of an unglaciated valley. Why was glacial erosion so much more effective on the south rather than on the north side of the range as is more common?

✓ Lake quadrangle, Wyoming
Account for the flat-topped areas. Account for the through valleys such as Two Ocean Pass.

Write summary of the province on outline previously used.

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Map and aerial view of Glacier National Park and map of glacial deposits of Montana 24-40
Compare the vigor of glaciation here with that of other areas thus far studied in the Rocky Mountains. Explanation? Compare the number of surviving glaciers and account for their distribution. Name five typical cirques, three good examples of hanging valleys, three aretes (narrow divides between cirques), two rock steps (give explanation), five alpine peaks or "horns". Locate remnants of the preglacial upland. What is the structural relation of the bed rock to that of the plains. Explain with a cross section. Account for Chief Mountain. Account for the elongated lakes. What is the cause of the narrows in St. Mary Lake? How far did glaciers extend onto the great Plains? Consult U. S. G. S. Bull. 600 in library.

Hamilton quadrangle, Montana-Idaho
Suggest possible explantions of (a) the straight border of the Bitterroot Mountains, (b) straight courses of some of the streams within the mountains. What signs of glaciation do you find (be specific) and what relation did it have to the flat floor of Bitterroot Valley?

Nyack quadrangle, Montana.
What topographic features suggest the nature of bed rock and its structure? Locate typical examples of (a) U-shaped valley, (b) hanging valley, (c) glaciated non-hanging or accordant valley, (d) cirque, (e) rock step, (f) non-glaciated valley, (g) outwash terrace.

Saypo quadrangle, Montana
Illustrate with sections four (4) different structural interpretations of the origin of the hogbacks.

Rathdrum quadrangle, Idaho
Account for the lakes. Have you seen the same thing in the field. See New York State Museum Handbook No.1 on Allegany State Park (library).

also Am assoc Am geogr 10-114-117

Philipsburg Folio, No.196, Montana
Read sections in Introduction of "Relief" and "Drainage"; "Topography", p. 2, "Tertiary and Quaternary systems" p.p. 10-12; "Physiography", p. 21; "Physiographic development" and "Quaternary Period", p. 23. Account for Philipsburg Valley and its narrow outlet. Account for the present conditions at Georgetown Lake. Try to find remnants of the peneplain and discuss the evidence on which it is based. Is there a definite relation between the cirques and the kind of rock? Discuss.

Write a summary of the province on outline previously given.

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PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Colbrado Plateau, Edition 1937

Kaibab, Arizona

Compare the origin of Kaibab Vermillion and Shinarump Cliffs with that of the cliffs on the side of the Plateau. Draw an east-west cross section with vertical scale not exaggerated more than four times to show their relation. Find and discuss explanations of the "Esplanada." Account for course of west fork of Karab Creek.

Bright Angle, Arizona

Of what other map is there a resurvey? Read description on back. What are the depressions on the plateau surface? Account for the rapids in the River. Draw a cross section north from the station to north rim showing geology (see text for section and names, also model in museum). Account for the Tonto Platform.

Mt. Trumbull, Arizona

Account for Grand Wash Cliffs and Hurricane Ledge. Account for the mountains and buttes on the plateau. What other physiographic province is shown?

Henry Mts., Utah (See model on 3rd floor)

Use a cross section to explain structure and origin of Mt. Ellsworth and water pocket fold. What is Navajo Mt? What evidence do you find of recent rejuvenation of the streams?

Flagstaff, Arizona

Locate examples of (a) craters, (b) sinkholes, (c) cinder cone, (d) cirque.

San Rafael, Utah

Explain structure of San Rafael Swell.

Summary should include diagrams showing each major step.

Locate on map (a) Grand Canyon, (b) each subdivision of province, (c) Zuni Mts., (d) Vermillion Cliffs, (e) White cliffs, (f) Pink Cliffs, (g) Henry Mts., (h) Black Mesa, (i) Leed Ferry, (j) Grand Wash Cliffs.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory. Colorado Plateau, Edition 1937

Kaibab, Arizona

Kaibab

Compare the origin of Vermillion and Shinarump Cliffs with that of the cliffs on the side of the Kaibab Plateau. Draw an east-west cross section with vertical scale not exaggerated more than four times to show their relation. Find and discuss explanations of "The Esplanade." Account for course of west fork of Karab Creek.

Bright Angle, Arizona. Of what other map is there a resurvey? Read description on back. What are the depressions on the plateau surface? Account for the rapids in the River. Draw a cross section north from the station to north rim showing geology (see text for section and names, also model in museum). Account for the Tonto Platform.

Mt. Trumbull, Arizona.

Account for Grand Wash Cliffs and Hurricane Ledge. Account for the mountains and buttes on the plateau. What other physiographic province is shown?

Henry Mts., Utah

Use a cross section to explain structure and origin of Mt. Ellsworth and water pocket fold. What is Navajo Mt? What evidence do you find of recent rejuvenation of the stream.

Summary should include diagrams showing each major step.

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Mesa Verde National Park and geological map of Colorado
How may the geologic structure of this area be found from the map? What is the proper physiographic term for this upland? What term should be applied to streams on its north slope? On its south slope?

Diamond Creek, Arizona and geological map of Arizona.
Hod do you distinguish between an escarpment due to recession of a formation and one along a fault? How do you distinguish between a fault scarp and a fault line scarp? Which kinds of escarpments are present on this map?

Echo Cliffs, Arizona and geological map of Arizona.
Draw and east-west cross section along latitude 36-45 showing the geological relations of Vermillion and Echo Cliffs. What features on this map indicate rejuvination of the drainage? Explain

Kanab, Utah and model in museum
Illustrate the relations between geology and topography by a north-south section on the longutude of Clarkson. Draw section from top of Paunsaugunt Plateau south to edge of map. Do not exaggerate the vertical scale more than five times.

Abajo, Utah-Colorado and geological map of U. S.
Account for the Abajo Mountains illustrating their origin by a diagram.
Account for the ridge east of Comb Wash.

Castlegate, Utah and geological map of U. S.
Account for the Book Cliffs and other similar escarpments.

Vishnu, Arizona and geological map of Arizona.
Draw a cross section from Grand View Point to Cape Royal with same vertical and horzontal scales. Show the geological formations. Account for hanging valleys on this map. What evidences do you find here of two cycles of erosion? Suggest an explanation for the course of Colorado River.

Your summary should include as an integral part of the discussion a series of generalized cross sections to illustrate the physiographic history.

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Note: Consult geologic maps (a) on models in hallways, (b) U. S. Geol. Survey Bull 613, (c) U. S. Geol. Survey Professional Paper 76, (d) U. S. Geol. Survey Prof. Paper 93, (e) atlases of old surveys, last four in Geology Library

Kaibab sheet, Arizona
Compare the mode of origin of the Vermillion and Shinarump Cliffs with that of the cliffs on the sides of the Kaibab Plateau. Draw and east-west section with essentially same vertical and horizontal scale to show the geologic relations. Translate old names used on model to those now in use. Discuss two explanations of the bench within Grand Canyon. Find the northeastern continuation of the Torroweap fault scarp near the west center of the map south of Antelope Valley. Account for the isolated knobs east of this line and for the course of the west fork of Kanab Creek which rises west of the fault.

Bright Angle quadrangle, Arizona
This map is a resurvey of the southeastern part of the Kaibab sheet; compare amount of detail shown. Read the description on the back. Contrast the mode of weathering of the sediments and the massive rocks of the Granite Gorge. How many distinct cliff-making formations do you find. Identify (a) Kaibab-Coconino cliff, (b) Redwall cliff, (c) Tonto-Tapeats cliff. Using this data find the direction and amount of dip in feet per mile. Account for the relation between the Plateau drainage and the walls of the Canyon on the north and on the south sides. Account for the depressions on the Plateau surface which are shown with special contours. In what geological formations do you find springs? What is the prospect of finding water in a well at Grand Canyon station? Explain why it is found in wells farther south. Account for the straight course of Bright Angel Canyon and its alignment with the valley followed by the Santa Fe R. R. south of the Canyon. Account for the rapids in the Colorado River.

Vishnu quadrangle, Arizona
Draw a geologic cross section with same vertical and horizontal scales from Grandview Point fo Cape Royal. From this identify the main cliffs and trace them so as to find the dip of the sediments. Account for the differences between the sections of the Canyon in (a) Granite Gorge, (b) middle portion, and (c) Marble Canyon. Study the hanging valleys shown on this map (a) on Walhalla Plateau, and (b) above several of the cliffs within the canyon. State what conclusions you draw from this as to their origin and significance in relation to the erosional history of the region. Have the valleys on the Plateau surfaces been formed before or after the erosion of the Canyon? Explain fully. Account for the fact that the Canyon disregards the structure of the rocks in which it is cut. What actual evidences are found in this region of more than one cycle of erosion?

Mt. Trumbull sheet, Arizona
Account for Grand Wash cliffs and Hurricane Ledge. Locate escarpments of a different origin. What two Physiographic provinces are shown? Draw an east-west geologic section showing relations of the two. Account for the mountains and buttes on the Plateaus. Note the Torroweap fault scarp near the southeast corner of the map and trace it onto the adjoining Kaibab sheet (above).

Henry Mountains sheet, Utah
Draw a cross section from southwest to northeast through Mt. Ellsworth and Water Pocket Fold to show structure. Use same vertical and horzontal scale as nearly as possible. What is the structure of Navajo Mountain? What evidence does this region show of more than one cycle of erosion?

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Columbia Plateau, Edition 1938

Refer to geological map of United States and geological map of Washington. See also reading referred to in calendar.

Quincy, Washington

Account for the "potholes" and give their correct physiographic name. What relation do they have to the Scablands? How do they prove large volume of water?

Moses Lake, Washington

Account for the "potholes". See text for correct designation.
What evidence shows how wide the stream once was?
What evidence is there of subsequent wind work? How does it account for the lake?

Beverly and Red Rock, Washington

How does the topography show the structure of Saddle Mt? What other structure is suggested in places? What has altered the north face of the mountain? Name and describe some of the other features of the same origin including Natural Corral and valley between two maps north of Crab Creek. What is the probable origin of the course of the Columbia River?

Bend, Oregon

Account for the falls and for the buttes.

Maloga, Washington

See Jour. Geol. Vol. 38, pp. 385-396. How does Bretz classify the 925 ft. terrace at Columbia River? Does Moses Coulee also contain a gravel fill? Locate Scabland opposite mouth of the coulee, also moraine on terrace and landslide topography. What does the last resemble?

Summary should include in proper place discussion of (a) the "scabland controversy" and (b) the course of the rivers in the Yakima district as discussed in class. Show on your map (a) area of Scablands, (b) Waterville Plateau, (c) Palouse county, (d) Moses Coulee, (e) Grand Coulee.

GEOLOGY 130

PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Columbia Plateau, Edition 1937

Refer to geological map of United States.

Quincy, Wash.

Account for the "potholes" and give their correct physiographic name.

Moses Lake, Wash.

Account for the "potholes". See text for correct designation .

What evidence shows how wide the stream once was?

What evidence is there of subsequent wind work? How does it account for the lake?

Beverly and Red Rock, Wash.

How does the topography show the structure of Saddle Mt? What other structure is suggested in places? What has altered the north face of the mountain? Name and describe some of the other features of the same origin. What is probable origin of course of Columbia River?

Summary should include discussion of (a) the "seabland controversy" and (b) the course of the rivers in the Yakima district as discussed in class.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Columbia Plateau, Laboratory
Edition of 1934

Refer to geological map of U. S.

Quincy, Washington
Account for the "Potholes" and other similar features giving the correct term. What must have been the condition of the Columbia valley when these were being formed?

Moses Lake, Washington
Moses Lake is part of the Grand Coulee. What caused the latter? What seems to enclose this lake? Account for the XXXXXXXX "potholes". What name is applied to this kind of topography? What evidences of a very wide stream do you find? What evidences of wind work?

Spokane, Washington
What was the topography of the mountains when the lavas were formed? Explain. Account for the hills like Pleasant Prairie and for the lakes in the eastern part of the map.

Winchester, Washington
Account for the topography shown.

Sumpter, Oregon
What kind of rocks are found in this range of mountains? Why is it included in the Plateau? What effect has glaciation had on it?

Pullman, Washinton-Idaho
Account for the topography of the uplands, for Kamak Mountain and for the gorge of Snake River? Does anything suggest two cycles of erosion?

Prosser, Washington
What geological sturcture is suggested by the topography? Illustrate by sketch. Is there any suggestion of two cycles of erosion?

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PHYSIOGRAPHY OF THE UNITED STATES
Columbia Plateau, Laboratory

Quincy, Washington
Account for "The Potholes" and the similar area near Frenchman Springs. Give two possible explanations for the depressions in the Columbia River terraces. What is the time relation between the formation of the potholes and the terraces. Give two possible explanations of the depressions on the plateau surface.

Moses Lake, Washington
Moses Lake occupies part of the Grand Coulee. What caused the latter? What shuts in this lake? Account for the potholes. What name is applied to this kind of topography? Note the banks of the former stream. What are the crescent-shaped hills nearby.

Malaga, Washington
At what levels above the Columbia River do terraces occur? What was the level of the Columbia when Moses Coulee was formed?

Beverly and Red Rock, Washington
Give two possible explations of the structure of Saddle Mountain illustrating them with diagrams. Suggest possible origin of Frenchman Hills and [illegible] of Crab Creek valley and of the Natural Corral. Explain the course of Columbia River.

[illegible]
Silver City Folio, No. 104
Read section on "geologic history". Study geologic sections. What evidence is there of uplift since the formation of the Tertiary basalt flows? How is the geologic age of these eruptions determined?

Summary as usual-be brief

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Basin and Range, Edition of 1936

Chisos Mountains, Texas
Account for Mariscal Mt. and for the parallel ranges to the northeast. How could you explain the course of the Rio Grand River through Mariscal Mt.? Account for the east-facing escarpment on the west side of Mariscal Mt., northwest of the name. Explain the open-spaced contours around the Chisos Mountains.

Van Horn, Texas
Account for the Sierra-Diablo. Explain the course of Victoria Creek ... after it leaves the canyon. What changes have occured on the Sierra Diablo and why? Account for Apache Canyon. Locate fault scarps in the eastern part of the map. What hypotheses might explain this enclosed basin in what is often called the "open basin region".

Terlingua, Texas. - See cross section of central U.S. by Kansas Geol. Soc. Describe and explain the Mesa de Anguila and suggest two possible explanations of the course of the Rio Grande across it. Account for the Solitario and classify the streams and their tributaries which rise within it.

Toole Valley, Utah
To what class of mountains do these ranges belong? In what stage of erosion are they? Account for the flat areas.

Furnace Creek and Ballarat, Col.-Nevada
What proofs are there that the basins between those mountains are of structural instead of erosional origin? Locate several possible fault scarps. What are the belts of brown stippling on the lower slopes of the mountains?

Playas, New Mexico
In what stage of the erosion cycle are these mountains? What evidence is there of block origin? What general term is suggested by the name of the "lake"? What term is applied to a basin containing such a lake.

Deming, New Mexico and geological map
Why does the geological map show no faults along the sides of these ranges? Compare these mountains with those of Furnace Creek region.

Mt. Riley, New Mexico
Locate (a) block mountain, (b) volcanic cones. Account for the depressions in the southern part of the map giving more than one possible hypothesis.

Salton, Sink, California
Account for the low level of the Salton Sea so close to tidewater. Account for the "ancient beach line".
Geological map of Arizona
Account for the boundary between the Colorado Plateau and the Basin and Range Province in different parts of the state. What two kinds of mountains occur in the latter? Why are so few faults shown along the block mountains? What evidence of concealed faults? Account for "through streams" and lost streams.
Write summary of province as usual - include a brief discussion of the controversy over the origin of "Basin Range" and discuss origin of pediments.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, ~~Colorado Plateau~~ Basin & Range, Edition 1934

Kawich, Nev.
Make a simple sketch map showing the probable faults which outline the mountain blocks. What is the probable origin of the lower slopes of the mountains and of the enclosed basins? Cite evidences seen here.

Maricopa, Ariz.
To what class do these mountains belong? Cite evidence. Can you discover an old erosion surface on the top of the Sierra Estrella? What is the probable origin of the lower ~~XX~~ slopes of the mountains? What is their average slope in degrees (one degree = about 90 feet per mile).

Salt Lake, Utah
Make a simple sketch map outlining the fault at the foot of the Wasatch.

Ballarat, Calif.-Nev.
Discuss possible origins of the enclosed basins. Account for the great variation in level of Owens Lake. What kind of water must be present in it? Locate examples of sand dunes and of recent alluvial fans. From evidence shown on the map decide which is more important in the erosion of the desert, wind or water.

Van Horn, Tex.
What is the probable origin of the Sierra Diablo illustrating with a diagram. What evidences shown on the map suggest recency of its formation? Describe and locate each of them.

Terlingua, Tex. and geol. cross ~~XX~~ section of central U. S.
Account for the relations of the Grand Canyon of Santa Helena to the structure of the bed rocks illustrating with a section. Classify the streams of the Solitario and explain its geological structure.

Salton Sink, California
Explain the history of the Salton Sea citing evideces seen on the map.

Refer to geological map of U. S. and map of Arizona where not otherwise given.

In the summary be sure to explain (a) the three rival theories to account for the topography of the province with reasons for and against acceptance of each, and (b) the origin of the several kinds of desert plains.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Basin and Range

Chisos Mountains, Texas
Account for Mariscal Mt. and for the parallel ranges to the northeast. How do you explain the course of the Rio Grande River through Mariscal Mt.? Account for the east-facing escarpment on the west side of Mariscal Mt., northwest of the name. Explain the open-spaced contours around the Chisos Mountains.

Van Horn, Texas
Account for the Sierra Diablo. Explain the course of Victoria Creek after it leaves the canyon. What drainage changes have occured on the Sierra Diablo and why? Account for Apache Canyon. Locate fault scarps in the eastern part of the map. Account for the enclosed basin in what is often called the "open basin region."

Terlingua, Texas.
Describe and explain the Mesa de Anguila and suggest two possible explanations of the course of the Rio Grande across it. Account for the Solitario and classify the streams and their tributaries which rise within it.

Tooele Valley, Utah
To what class of mountains do these ranges belong? In what stage of erosion? Account for the flat areas and enclosed basins between the ranges.

Furnace Creek and Ballarat, Cal.-Nevada
What proofs are there that the basins between these mountains are of structural instead of erosional origin? Locate several possible fault scarps. What are the belts of brown stippling on the lower slopes of the mountains? What kind of water would you expect to find in Owens Lake. Account for the wide variation in its level.

Whitetop Mt., Cal.-Nev.
Account for the shape of the lower slopes of the mountains and locate possible fault scarps giving your evidence.

Playas, New Mexico
In what stage of the erosion cycle are these mountains? What evidence is there of block origin? What general term is suggested by the name of the "lake"? What other term is applied to such a basin?

Deming, New Mexico and geological map
Why does the geological map show no faults along the sides of these ranges? What source of water is available for the inhabitants of the valleys as there are no streams?

Mt. Riley, New Mexico
Locate (a) block mountain, (b) volcanic cones. Account for the depressions in the southern part of the map giving more than one explanation.

Salton, Sink, California
Account for the low level of the Salton Sea so close to tidewater. Account for the "ancient beach line". What risks are associated with the construction of such irrigation works?

Geological map of Arizona
Account for the boundary between the Colorado Plateau and the Basin and Range Province in different parts of the state. What two kinds of mountains occur in the latter? Why are so few faults shown along the block mountains? What evidence of concealed faults? Account for the "through streams" and lost streams.

Write summary of province as usual

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Sierras and Cascades, Edition of 1938

Yosemite and Yosemite Valley, California. See also Prof. Paper 160 (maps). Read the legend on the back of the Valley map. On the map pick out remnants of the several erosion levels, locating them definitely. Account for the differences between Yosemite Valley above and below Old Inspiration Point. Account for the angular outline of the Valley. Explain the falls in both Yosemite and Hetch Hetchy Valleys. Account for the "domes". How did the structure of the rock affect glacial erosion? What bearing has this on the problem of glacial erosion in general?

Mt. Lyle, California
What division of the Sierras is shown? What evidence does the map show of change in elevation of the land? Make a short list of the main topographic features of the map. (Avoid duplicating what you have in summary.)

Olancha, California. See Jour. Geol. 44, 631-638.
Account for (a) upland meadows, (b) domes, (c) east side of Sierra Nevadas, (d) Kern Canyon.

Mt. Rainier and Mt. Rainier National Park, Washington. See Mt. Rainier Nat. Park Bull.
Read legend on back of Park map. Explain effect of glaciation on shape of the peak and of adjacent mountains.

Crater Lake National Park, Oregon. See also G. S. A. 47, 1809-1830.
Read legend on back of map. Outline the evidences in tabular form which indicate each suggested method of origin of the lake. What evidence shows that Mt. Mazama was glaciated?

Mt. Hood and Vicinity, Oregon-Washington. Geological map of Washington.
Discuss the origin of valley of the Columbia. What evidence is there of a relatively recent uplift of this region? Locate landslide deposits. What significane may they have on history of Columbian Plateau.

Tehama, California
What evidence is there of more than one cycle of erosion? What evidence is there of faulting? of alluvial filling?

Summary as usual. Discuss in proper place (a) origin of Columbia Valley the mountains. (b) peneplain problem in the Cascades, (c) glacial erosion in the Sierra.
Locate on map (a) Mt. Shasta (b) Mt. Whitney (c) Glacier Peak (d) Lassen Peak.

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PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Sierras and Cascades, Edition of 1936

Yosemite and Yosemite Valley, California
Read the legend on the back of the Valley map. On the map pick out remnants of the several erosion levels, locating them definitely. Account for the differences between Yosemite Valley above and below Old Inspiration Point. Account for the angular outline of the Valley. Explain the falls in both Yosemite and Hotch Hotchy Valleys. Account for the "domes". How does the structure of the rock affect glacial erosion?

Mt. Lylo, California
What division of the Sierras is shown? What evidence does the map show of change in elevation of the Land? Write a short explanation of the main topographic features of the map.

Olancha, California
Account for (a) upland meadows, (b) domes, (c) east side of Sierra Nevadas, (d) Kern Canyon

Mt. Rainier and Mt. Rainier National Park, Washington
Read legend on back of Park map. Explain effect of glaciation on shape of the peak and of adjacent mountains.

Crater Lake National Park, Oregon
Read legend on back of map. Outline the proofs in tabular form which demonstrate the method of origin of the lake. What evidence shows that Mt. Mazama was glaciated? What evidences of postglacial erosion do you fine on the map?

Mt. Hood and Vicinity, Oregon-Washington
Discuss the origin of valley of the Columbia. What evidence is there of a relatively recent uplift of this region?

Tohama, California
What evidence is there of more than one cycle of erosion? What evidence is there of faulting? of alluvial filling?

Summary

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Pacific Coast Province Edition 1938

Point Reyes, California
What is physiographic significance of (a) shape of shore at Point Reyes, (b) Drakes Estero, (c) shore line between Pt. Reyes and Tomales Point, (d) Tomales Bay, (e) course of Walker Creek, (f) Chileno Valley, (g) course of streams above Point Reyes Station, (h) 125 foot terrace in Drakes Bay, (i) bar on N side of Drakes Bay.

San Francisco, California See Folio 193
Account for San Francisco Bay - for the flat at Berkeley.

Marysville Buttes and Vicinity, California
Account for the Buttes, for Sutter Basin, for the valleys parallel to the edge of the Buttes NW of North Butte and W of West Butte.

Compton, California See A.A.P.G. 11, 417 and 12, 515
Account for the form of Dominguez Hills

San Antonio, California
Account for the topography of Mohave Desert. Describe what effects of faulting on topography you can find.

La Jolla, California - See Water Supply Paper 446, maps.
What evidences can you find of recent changes in level of the land?

Coos Bay, Oregon See Folio 73
Outline the evidences of changes of level and coastal outline shown in this map.

Summary.
Show on your map (a) Klamath Mts. (b) Oregon Coast Range (c) California Coast Range (d) boundaries of all subdivisions (e) Marysville Buttes (f) Olympic Mts. (g) San Gabriel Mts. (h) San Bernardino Mts. (i) San Andreas Rift. See model in hall and fault map of California.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES

Laboratory, Pacific Coast Province Edition 1936

What is physiographic significance of (a) shape of shore at Point Reyes, (b) Drakes Estero, (c) shore line between Pt. Reyes and Tomales Point, (d) Tomales Bay, (e) course of Walker Creek, (f) Chileno Valley, (g) course of streams above Point Reyes Station, (h) 125 foot terrane in Drakes Bay, (i) bar on N side of Drakes Bay.

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La Jolla, California - See Water Supply Paper 446.
What evidences can you find of recent changes in level of the land?

Coos Bay, Oregon
Outline the evidences of changes of level and coastal outline shown in this map.

Summary.
All reports must be in before the time of the examination.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Sierras-Cascades
Edition of 1934

Refer to geological maps of California and U. S.

Yosemite and Yosemite Valley Refer also to U. S. Geol. Survey Prof. Paper 160
Read the legend on the back of the map of the valley. On this map pick out remnants of the several erosion levels. Account for the differences in Yosemite Valley above and below Old Inspiration Point. Account for the angular outline of the cliffs for the hanging valleys and for the domes. Find another valley whose origin is similar to that of the Yosemite Valley. Explain just how glacial erosion operated in this region.

Crater Lake National Park
Read the legend on the black of the map. Outline the proof of the orgin of the lake. What evidence demonstrates the former glaciation of Mt. Mazama? Explain the structure at Llao Rock, Cleetwood Cove and the islands west of Wizard Island.

Mt. Whitney
What features can you find on this map (state where) which were due to glacial erosion? What evidence do you find of the origin of Owens Valley and Alabama Hills and what evidence is there that this process is still in operation?

Jackson
Locate examples of ridges parallel to the strike of mountain folds, of subsequent valley, of remnants of an old mature surface, of valleys of the present cycle of erosion, of hanging valleys not due to glaciation.

Ashland
What physiographic provinces are shown? Find the boundary and state what relation it has to Crater Lake.

Mt. Rainier
How high above the "Cascade Peneplain" does the mountain rise? What evidence is there that its glaciers were once more extensive locating specific examples. How does the age of the mountain compare with the age of adjacent valleys?

Illustrate physiographic history with a series of cross sections.

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Laboratory, Pacific Border Province

Point Reyes, see Fault Map of California as well as geological map
Locate examples of block mountain, fault scarp, trinagular facet, stream on fault line, drowned valley, raised shore line, sand dunes, sand spit, sea cliff and stack, hanging valley (state origin). What physiographic history is demonstrated by drainage of north part of map?

Marysville Buttes
Account for the Buttes and for the several types of plains (see text).

San Diego
Account for the Bay and for North Island

Downey and Compton, see oil map of California
What is origin of the borad plain? of the range of hills from Dominquez southeast? Is there any suggestion in the topography of the anticline at Santa Fe Springs? What do these features prove about the physiographic history of the region?

Tacoma
Outline the physiographic history of the region (see text) citing examples on this map which prove the several steps.

Priest Valley, see Fault Map
How is faulting expressed in the topography

Dunnigan
Give two possible explanations for the straight border of the Coast Range. What types of plains are found here? What different kinds of lakes?

Summary as usual

"30"

GEOLOGY 130
PHYSIOGRAPHY OF THE UNITED STATES
Pacific Ranges and Valleys
Laboratory

Yosemite and Yosemite Valley, California
Read the legend on the back of the Valley map. On the map pick out remnants of the several erosion levels, locating them definitely. Account for the differences between Yosemite Valley above and below Old Inspiration Point. Account for the angular outline of the Valley. Which seems to have been the more important- rock structure or glacial abrasion? Explain the falls in both Yosemite and Hetch Hetchy Valleys. Account for the "domes".

Mt. Lyle, California
What division of the Sierras is shown? What evidence does the map show of change in elevation of the land? Write a short explanation of the main topographic features of the map.

Olancha, California
Account for (a) upland meadows, (b) domes, (c) east side of Sierra Nevadas, (d) Kern Canyon

Mt. Rainier and Mt. Rainier National Park, Washington
Read legend on back of Park map. How high above the average top of the Cascades does Mt. Rainier rise? Study the map and locate (a) remnants of an older maturely eroded surface, (b) stream captures, giving probable cause, (c) cirques, (d) volcanic craters, (e) Alpine or Matterhorn peaks. Explain each.

Crater Lake National Park, Oregon
Read legend on back of map. Outline the proofs in tabular form which demonstrate the method of origin of the lake. What evidence shows that Mt. Mazama was glaciated? What evidences of postglacial erosion do you find on the map?

Mt. Hood and Vicinity, Oregon-Washington
Discuss the origin of valley of the Columbia. What evidence is there of a relatively recent uplift of this region? What is the lower limit of present and of Pleistocene glaciation?

Tehama, California
What evidence is there of more than one cycle of erosion? What evidence is there of faulting? of alluvial filling?

San Bernardino, California
Account for the gently sloping areas around and west of San Bernardino and for the brown stippled areas. Account for the distribution of the present streams.

Seattle, Washington
What shore line alterations due to natural processes are now going on? to work of man? Account for the irregular shoreline and the lakes.

Pt. Reyes, California
Locate (a) block mountains, (b) fault scarp, (c) triangular facet, (d) stream on fault line, (d) drowned valley, (e) terrace due to change in level of land, (f) sand dunes, (g) sand spit, (h) shore cliffs in rock with stacks, (i) hanging valley due to wave work, (j) stream reversal due to faulting. Discuss the physiographic history demonstrated by features in north part of the map.

Write summary of province.

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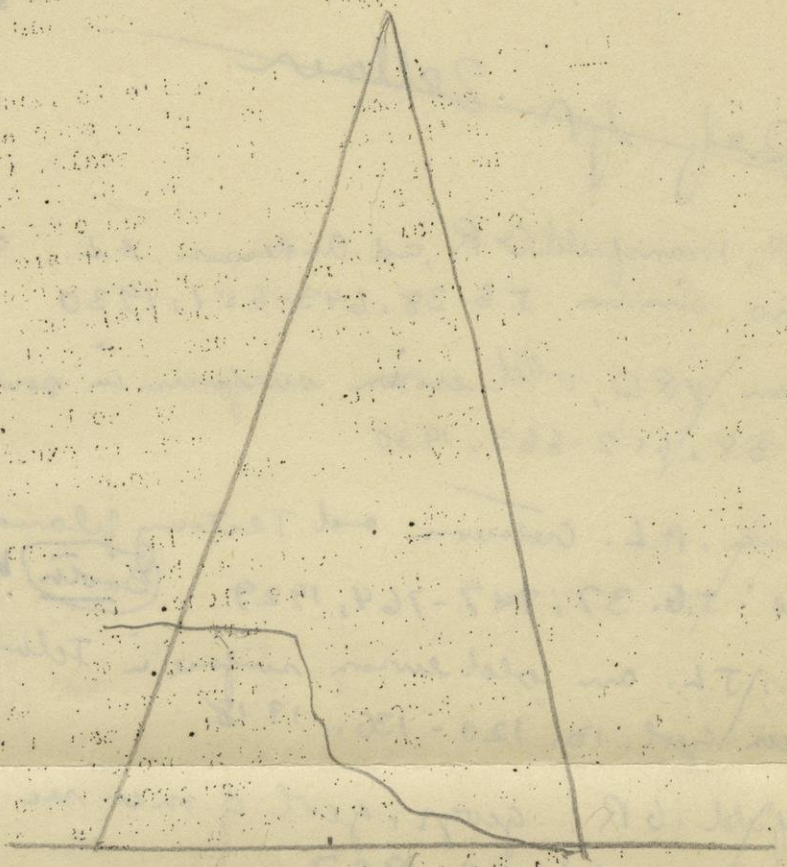

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