Rec'd Nov 9
Ans — 10

Chattanooga, Tenn.,
November 6. 1878.

Dr. George Engelmann,
St Louis, Mo.

Sir,

At the suggestion of Mr Sereno Watson, I take the liberty to ask you for information on the following subject:-

There is on the slopes of the Yellowstone (and tributaries) and Missouri, beginning at about the 106° longitude, a species of Pine which is, in most places, the only one, and everywhere the prevalent species, from the line mentioned to the foot-hills of the Rocky Mountains. It is a 3-leaved pine with prickly scales, 20-40° high, often crooked

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with rough bark, growing in sandy and rocky soil. The leaves are 2-4' long, and the cones are small, 1-3' long.

After comparison I set it down as the P. rigida, altho' it seems to be out of the habitat of that species.

The only other possible species, and one found in that region, is the "ponderosa" but the p. has long leaves (nearly twice as long as this species) and likewise heavy cones, at least twice as large and more cylindric. The prickles however are very much alike.

I had a work describing the ponderosa, while encamped on the Yellowstone, in groves of the pine in question, and never thought them, it could be that species.

Hoping you may be able to

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solve this difficulty, and in so doing, very much oblige an amateur botanist

I remain,

Very Respectfully Yours,

V. Havard

A. Surgeon. U.S.A.

Chattanooga. Tenn.

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Rec March 5th
Ans — 8th

Presidio, Texas
February 23. 1881.

Dear Sir,

I send you, by this mail, more specimens of the oak of this region, according to you, a form of the Q. virens. I regret not to have more acorns: a few are loosely thrown inside the package at the last moment; they were detached when received (from the Chenati nts) and do not know to which specimens they belong. As you will see, the specimens come from 3 different places: one set from the Chenati mountains, altitude 5000 feet, 25 miles north of Presidio del Norte: the second set from Fort Davis, altitude 6000 feet, 100 miles north of Presidio: the 3d set from the Sierra Rica, a mountain 10 000 ft high, in the Mexican State of Chihuahua, 35 miles S-E of Presidio, collected at altitude of about 8000 ft.

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The Pine, I suppose P. edulis, covers the top and the higher slopes of Sierra Rica, and as far as I can ascertain is the only pine on that range; it is not found on the Chenati Mts which are only 8000 ft. high. The oak, I found shortly after crossing the Pecos; westward, to this place, I have not seen any other kind; I do not know how far it may extend west of Presidio and Fort Davis. I am inclined to believe with you, that these specimens are only different forms of the same species; several of these forms are generally found growing together in the same mountain cañon. The finest trees I have seen were at Wagner's Spring (75 miles W. of Rio Pecos); several seemed to me identical with the Q. virens I had before closely observed in North Carolina, and were 40-45° high with a diameter of 18". The average oak of this region, however, is not more than 20-30° high with a trunk of

8–12′ in diameter; it branches from near the base seldom leaving room enough for a man to pass without stooping under the lower limbs. The branches spread out so that the diameter of the tree is, at least, equal to its hight. The wood is exceedingly hard and compact; one stem, 7 in. in diameter, (which I succeeded only in cutting to the center with a dull axe) showed 96 concentric rings; another, which I measured and counted carefully, is 11′ in diameter and has 63 rings; the latter is a good average specimen of the best trees. This oak makes excellent fuel but the stem is too short for lumber; it could however furnish excellent railroad ties.

I shall send you a few flowers as soon as they can be procured. I should say that Dr. Girard, until lately at Fort Davis, sends specimens of it (only young leaves) to Dr. Gray, with acorns and flowers, who named it twice Q. undulata; I believe however that his list was written in a hurry –

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The two Arbalonimus I sent you (fissuratum and Williamsii) were found together on a rocky hill, near Cibolo Cañon, about 20 miles (in a straight line) north of the Rio Grande (Presidio) and consequently in Texas.

Very truely
Yours.

V. Havard

P.S. I may add that this oak abounds in most mountain cañons of this region (S. Western Texas) where it can get a little moisture; in the Chenati mts alone it could supply several smelting works with fuel for years —

Having been unsuccessful in procuring your papers on Agave I shall be thankful if you will please send me a copy

VH.

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Rec Hot Sulph Springs Col Aug 6
Ans same day & Oct 2d

Fort Concho, Texas
July 26, 1881

Dear Sir,

I send you a box of miscellaneous plants collected this summer in Western Texas, with request that you would please, at your leisure, to look at them and tell me their names. As I have duplicates you need only refer to the nos. Most of them are Euphorbiaceæ, and I hope there may be something interesting among them. There are specimens, in blossom, of the Vitis which I already sent you last winter, with ripe fruit, from Cibolo (Chenati Mountains) – Also specimens of a Vitis found further east, on the Concho River, possibly the same altho' the leaf and fruit are somewhat different. I also inclose other specimens, in blossom, of the Oak (Q. virens?) prevalent in Chenati Mts. and Mts. of the Limpio, as well as further east and west. The stamens, as far as I can make out under a lens, are <u>not</u> pubescent but rugulose. The germinating acorns however (several broken specimens inclosed)

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show the peculiar long stalks described in your paper.

Here is specimen of a different Oak (Q. rubra or coccinea?) likewise found in Mts. of the Limpio (Fort Davis); these two, together with Q. Emoryi, are the 3 Oaks of the region.

Lastly there is a specimen (leaf half dried up and unripe capsules) of an Agave common on the higher Mts. of Western Texas, the same I have sent you before from the Chenati Mts. The leaf is of average size; in the green state, of course, much thicker and more flattened out, 5-6 in. in width. The stout stem is about 4 in. in diameter and 15 or 20 feet high. It must be the same doubtful species mentioned in your "Notes" page 33 as No. 1906 of Wright. It seems too large for the A. Wislizeni, and looks more like a small form of the A. Americana. I may be able to send you other specimens including ripe seeds. From the dry flower I make out the following description: Flowers 1½ in. long, or more; lobes equal to, or shorter than, tube of perigon; stamens inserted above middle of tube, exsert about ¾ in. above

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lobes; style exserted 1-2 inches —

I am sorry to say that I have done nothing in Cactaceæ; I had to leave Presidio as I was contemplating a trip down the river (Rio Grande) to collect some, with a view specially to the arborescent forms you mentioned to me. I am now going over the Staked Plains with an exploring expedition, and shall collect what I can, but I fear it is too late to do much, least of all in Cactaceæ.

You can address me here: Fort Concho, Texas. Your letter will be forwarded —

Hoping you are well and that I shall soon have the pleasure to hear from you

I remain Very Sincerely Yours.

Dr. V. Havard
U. S. Army

Dr. G. Engelman
3003 Locust Street
St Louis Mo.

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2. G. grüner, vil cordat & ovat (t)
7. 8. Agaur. heterosanthes (& Lechuguilla) ft. in term
14 G. mitor var
24 G. angustifolia Germination
17 V. vispanica (not elata!)
10 ? V. vispanica very stipes, thin diaphr (4 = 10^4)
? larger sp., thicker, thick diaphrag. short stipes, narrower sharply acute lobes (? cf. Jones)
16 Vitis vulpina ?
20 Cuc. squamata!
21 C. Grönovii
6 Lepth. stolonifera C
22 C. antisyphilitica Jurc
8. & 1 Condo C. Prestii
3 C. marginata Pond
23 Mallophora Carolinian
19 M. Lindheimeri

21 Fragaria stylaris } = ramosa
11 Fragaria "
13 Gale. fulidulosus Eur.
12 Cedar s. nobles Fur
5 C. cospitalosus Eng.!
4 Stellaria cyclostachya var lineafolia
15 S. ~~Jonesiana Mell~~ Jonesiana Mell 6. 4p
9 Megarrhiza Petrophila spath-lt

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Rec'd Jan 10
ans Jan 29

of an Indian accouchement — the minor details must be obtained from Indian midwives.

I received a few days ago your kind letter in reference to my package of plants; many thanks for it. I am very sorry that you had to pay postage of the expressage; I had given special instructions to have it prepaid in San Antonio but it seems they were neglected; I shall be obliged if you inform me of the amount of the bill. I intend to devote most of my leisure time this coming summer to the flora of this part of Texas. I shall think of the species you mention in your letter, and possibly send you my whole collection of Cactaceae. I received a few weeks ago a copy of the Mexican Boundary Survey, where I see described & figured several of the species I asked you about. I write you today in great hurry as we are busily preparing for an expedition down the river in the Chisos Mts; I shall probably write you again soon when more at leisure after observing a few more of the botanical features of this country.

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Very Sincerely & gratefully
Yours

V. Havard
U.S.A.

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Presidio Presidio Co
Texas

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Rec March 27
Ans " "

San Antonio, Texas
March 23. 82

Dr. Geo. Engelmann
St Louis, Mo.

Dear Sir,

I received in due time your kind letter of Oct. 2. containing the names of the specimens I sent you last summer from Fort Concho, Texas, and beg you to accept my sincere thanks for your valuable information. Hoping that these Texas specimens may not be without interest to you, I shipped, yesterday, by express, another box with following contents:

Euphorbiaceæ from 26 to 43 inclusive
Oaks " 44 to 75 "
Junipers " 76 to 80 "
Loranthaceæ " 81 to 83 "
Quercus virens. 84.

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all these plants were collected in southwestern Texas during the past summer and fall. The oaks are somewhat confusing; I inclosed some packages of acorns to assist in their determination. The Live Oak (84) is common about San Antonio and is a botanical feature of the country for west of it: it does not seem to vary in its form and is everywhere readily recognized; in my next letter I shall give you the exact range of it in Western Texas. The most common oak in W. Texas is what you determine as the Q. gravesii; after closer examination I found that it had caducous leaves falling late in the winter; it is pretty well characterized and generally reaches the ~~size~~ proportions of a fair-sized tree with spreading, round top. It is the only kind I can recollect having seen in the Chenati mts. In the Guadalupe mts it dwindles down to a shrub running into the various forms of the Q. undulata. The latter (if properly forms of Q. undulata

do not seem to conform with your descrip-
tion; the specimens with crisp, pungent
leaves are much greener than the others
with sinuate or entire leaves, these tending
towards the whitish, cinereous aspect of the
grised. There is also a peculiar form
prevalent on Eagle Mt., Cormudas, Umerto,
&c., which seems to be intermediate (or hybrid?)
between the grised and Emoryi, (58, 60, 61, 62)
which, where these two species grow together
as at Ft Davis & Umerto Spring, can be
seen to connect them although distinct from
either. The Q. Emoryi is often a large
lofty tree, 3°-4° in diameter; 59 & 60 are
medium-sized tree with habit of Q. Emoryi,
some leaves nearly as large as those of
some chesnut oak, others approximating
a stiff form of grised.

I have (with perhaps a few exceptions)
duplicates of all the specimens in the
box sent you so that you can help your-
self to any of them which may be

useful or interesting. May I ask you to replace the others in the box, screw the lid on, and ship it back to me by express, the charges to be paid here on delivery?

I have also something to tell you about the several species of Agave observed and may send you specimens of them. I shall write again when I have more leisure regarding them.

Hoping you are in the enjoyment of good health I remain

Very sincerely & respectfully
Yours.
V. Havard
U.S.A.

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Ans May 17

Dr. Geo. Engelmann
St Louis, Mo

San Antonio, Texas
May 13. 82

Dear Sir.

I again send you, by express, a few specimens: they have been knocked about so much that they look pretty bad: useless to say that nothing is to be returned. The large Agave, in bottom of box, (Agave Wislizeni?) is apparently the same I have sent you from the Chenati Mts, but not quite so large: it is the prevalent Agave in the Limpio (Texas) and Guadalupe (N.M.) Mts; it varies much in size from the small rhombic leaf 1-2' wide, 4-5 inches long to the large-sized leaf, 5-6' wide, I have seen in the Chenati Mts. In the Guadalupe Mts I took notes of some measurements, &c, I now give you: Rather common on southeastern slopes of Guadalupe Mts in all stages of development. Rosette of leaves from 6' to 3 feet in diameter. Stem 12-15° high, 3 inches thick 1 yard from the base, covered with large, stiff, appressed bracts but little smaller than the leaves below, growing smaller as they ascend, about 4' apart and displaying the 3/8 arrangement around the stem. (~~Further observed~~) Panicles mostly 13, also about 4' apart, each from 10 to 15 inches long, the flor peduncle being $\frac{1}{2}$ - $\frac{2}{3}$ the length of the panicle. Pods oblong, often tapering to the base, sometimes so as to appear stipitate. Full grown leaves, (from a fruiting specimen) exclusive of the white base which is 3-4' long, 12-14' long and 4'-5' wide. A different (determine grown, fruiting) specimen, near the first, has leaves only 10' long and

Agave

Wislizeni.

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2½ inches wide, and a shorter stem. Terminal spine at least 1½ inches long, decurrent on both sides. Bases of spines destitute in the green state, generally more or less connected in the dry state, but never running together so as to form a detachable margin. Spines irregularly arranged on upper two-thirds of the leaf, 9"-15" apart; closer set on lower third, 4"-8" apart, or nearly absent. The 2d 3d & 4th (from the apex) are commonly the largest, 3" long, straight or oftener hooked or bent upward or downward; those on lower third minute or absent. Stamens exsert, inserted in the tube at the junction of the two lower with the upper thirds. Old, rotting pits full of ashes and debris of this agave are seen about the huts showing that the Indians used it for food.

Scattered over the base of the Guadalupe Mts, very abundant on their northern slopes and common thence to El Paso is another agave of which leaves, fruit and flowers are inclosed in the box (upper layer) (a. deserti?). It belongs to your section III (paniculate), and is very variable in size and shape. As you will see the flowers are variously paniculed and often only geminate (or in threes) as in A. heteracantha. At first I thought I had 2 species, one a paniculate and the other a geminate, but daily observations showed me that these two extremes run into each other through many intermediate forms, and as I could see no difference in the foliage I was forced to the unsatisfactory conclusion that they belong to the same species. The stem of a rather large, grown specimen

Agave heteracantha

(paniculed) is 1½' in diameter near the base, and 10° high, including the pyramidal inflorescence, 4 feet high, and tapering to a point. The stem of an average specimen, with the flowers in two and threes, is smaller, from 5 to 8 feet, yet generally longer and thicker than that of the A. heteracantha I was familiar with on the shores of the Rio Grande about Presidio. The leaves of both forms (to me indistinguishable one from the other) are 10–15' high (maximum length of specimens measured, above the white base, 16 inches) and 1–2' wide (2' being maximum width). The specimen of flowers I send you is the only one I found in blossom so late in the season, and, although a geminiflora, was found near a clump of paniculed stalks. Unfortunately I had no certain specimens of A. heteracantha for comparison; as far as I can trust my memory the latter has shorter and narrower leaves, at least in the region where I observed it.

The A. americana, such as I see it in cultivation here, with its elongated leaves, 1°–3° long, and nearly parallel, many margins, coarse, stout and distant spines, &c., I have not seen growing spontaneously north of the Rio Grande —

In the box is also a huge bulb of the Cereus Greggii; at least the stem (wrapped in paper) which is inclosed for

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identification, answers to your description of that species. It was found in the Guadalupe Mts. Although rather old I think it may grow if you plant it at once.

You will find also rather poor specimens of the undescribed Bernardia. It is a ~~shrub~~ small bush 2°-3° high with crowded branches.

If you should desire a live specimen of A. Wislizeni for your garden I could probably send you one as it is cultivated here by several persons.

Inclosing I beg you to accept my sincere thanks for your last letters containing so much valuable information in regard to the oaks and other trees of western Texas.

I have not said anything to you about the pines & firs of the Guadalupe Mts, they were so easily identified that I did not trouble you about them; they are: 1 Pinus ponderosa, prevalent pine, 35°-50° high, 1°-2° in diameter 2 Pinus flexilis, small or middle-sized tree. 3 Pinus edulis, low, scraggy, seldom over 10° high, with mingled seeds 4 Abies Douglasii Common, next in prevalence and size to P. ponderosa.

In the Limpio Mts same pines as above, the P. flexilis nearly as large as the ponderosa and the edulis quite a tree, 6'-18' in diameter & 30-40° high, sometimes even sawed for lumber. The A. Douglasii I did not see in the Limpio Mts. The Chenalt Mts are destitute of pine or fir timber.

Very truly yours.
and thankfully.
W. Howard

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Rec'd Aug 3rd
Ans

San Antonio, Texas
July 30th 82

Dear Sir,

I am once more under obligations to you for your interesting and instructive letter of May 20th relating to my specimens of Agave and other plants. You mention that I sent you, about 18 months ago, a fruiting inflorescence and single leaf of Agave Wislizeni, and that the measurement of this leaf exceeds that ~~measurements~~ of the largest I measured in the Guadalupe mts.

It is so; the leaf referred to was sent from the Chenate mts (about 200 miles farther south) where the species attains larger dimensions; I think I stated this fact in my letter.

I shall now, yesterday by express, a well-dried specimen, various things: a full grown plant of Agave heteracantha, with

Mr. Ashby 3rd

good roots. I received it about 2 month, ago from near the shore of the Rio Grande at Presidio (Presidio Co.) Texas; it looked dried up and withered and had but few roots; I planted it and, to my surprise it grew vigorously. I do hope you will succeed here & stalk from it again next season. The other young plant is the proper mescal-plant from which the other is made. I hope you may find leisure to examine them; and let me know what they are. I may be able, if necessary, to send you a better specimen of No. 13 a shrub which has quite fragrant flowers.

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I am going to Eagle Pass on Aug. 1st and shall likely find good specimens in seed of Opuntia Dorsii. Mr. Reverchon cultivates it in his garden, and I have told him of your desire to have flower & fruit which he 'll bear in mind.

Very sincerely
Yours
V. Havard
Fort Duncan
Texas

Dr. Geo. Engelmann
St Louis. Mo.

Missouri Botanical Garden
George Engelmann Papers

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Rec Jan 8
Ans — 10

Eagle Pass. Texas
Jan 4 3 1883

Dear Sir.

I sent you yesterday, by express, a small package which I fear you will not find very interesting; when you have leisure please let me know its contents and oblige

Yours respectfully
Dr. V. Havard

P.S. I find a Mexican Cell- of Live Oak (Q. virens) beginning opposite Eagle Pass (on Rio Grande), reappearing at various places on high bluffs & hills, and extending into ~~Coahuila~~ Coahuila as far as the Santa Rosa hills, and probably much farther.

Dr. Geo. Engelmann
St Louis. Mo.

V.H.

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GEORGE [illegible] PARCE

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SAINT LOUIS JUN 26 5 PM

San Antonio Texas
June 26. 83

Dear Sir, Rec'd 28 Ans 24

I send you, by mail, 2 specimens of a small Agave collected near Eagle Pass. I cannot satisfactorily identify it. I tried to get other and more matured specimens but have only been able to find three, 2 of which I send you -

I shall start in a week or two for the Great Bend of the Rio Grande and hope to be able to collect fruits and seeds of interesting Cactaceae -

Truly Your.
Dr. V. Havard
U.S.Army

JUN 28 1883

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Rec Jan 28
Ans Feb 2

San Antonio, Texas
Jany 22. 84

Dear Sir,

I send you, by express, a small package of plants collected this past summer. On July 5th I visited Devil's River (San Pedro of all maps) and near the RR. crossing, within a mile, found what I took to be the following species of Grapes —

1 Vitis candicans (Munstang) quite ripe, abundant and luscious; ate several pounds without unpleasant effects.

2 V. rupestris, narrow sinus erect. 3-4° high
Only saw 2 or 3 very imperfect bunches and did not collect any fruit. Berries are small, black, 1-stoned and nearly ripe.

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3 – V. aestivalis ? flowers [no. 10 of specimens]
form with variable foliage; large bunches of small, crowded berries still quite green.

4 V. aestivalis, [no. 11 of specimen] [mistake? riparia?]
Leaves more glaborous than preceding; rather loose small bunches of black berries nearly ripe – This form abundant in mountain cañons

5 V. riparia –
Same form as that seen in Chenate nuts previously sent you – Bunches more dense and berries smaller than 4. The least ripe of all. Leaves smaller than in other species except no. 2 – ~~This species a form seems more common in cañons of Norther nuts (Guadalupe & Chenate nuts) while no. 4 preponderates in~~

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~~Cañon of Bofecillos~~

All these species grow luxuriantly and climb 30 and 40 feet along water courses. (No. 2 excepted)

I have also a few Cacti, including good fruit of Op. Davisii, which I shall send you in a few days –

Wishing you health and a very happy new year

I remain very sincerely & gratefully Yours.

Dr. V. Havard
U.S.A.
San Antonio, Texas

Dr. Geo. Engelmann
St. Louis, Mo.

(over)

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P.S. I inclose stereoscopic photograph of the large Agave prevalent in Guadalupe, Chenate Limpio and Chisos Mts. It was taken near the summit of Chisos Mts. Dimensions as follows: Diameter of rosette (2°7') two feet and 7 inches; width of leaves (below at line of separation from clasping base) ten and half inches (10"/2"); length, nineteen inches (19"); these measurements taken on the under or convex side; length of spines, 6"-9", and 1" or more apart above the middle; terminal spine 1½"-1¾" long; In full grown specimens height of stalk, 13°-18°, bearing from 8 to 15 panicles and 3'-5' in diameter.

all these notes refer to specimens seen in the Chisos Mts

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