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PART II.

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THE WOODS OF THE UNITED STATES.

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## THE WOODS OF THE UNITED STATES.

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A critical examination of the wood produced by the indigenous trees of North America, exclusive of Mexico, has been made in connection with the investigation of the forest wealth of the United States.

Mr. S. P. Sharples, special agent in charge of this department of the investigation, has had general direction of such experiments, and suggested the methods adopted for their execution.

The object of this examination has been to determine, first, the fuel value of the woods of the United States; second, the value as material for construction of the wood of the principal timber trees of the country. The results thus obtained are highly suggestive; they must not, however, be considered conclusive, but rather valuable as indicating what lines of research should be followed in a more thorough study of this subject.

The fuel value has been obtained by a determination of the specific gravity and the ash of the absolutely dry wood, supplemented by a determination of the actual chemical composition of the wood of some of the most important trees; the value of our woods for construction has been obtained by experiments made with the United States testing-machine at the Watertown arsenal. Each specimen as received was at once numbered, and this number, designated in the following tables as "Office number", was carefully repeated on every fragment cut from the original tree, and always refers to the same specimen. In a few cases in the early part of the work a sub-number was used to designate a specimen from another tree of the same species received from the same collector. In most cases the specimens were taken from the butt-cut of the tree, and unless it is otherwise mentioned in the remarks, were free from sap and knots; they may be regarded as representing the best wood that could be obtained from the tree.

The specimens used in the different series of experiments are deposited in the National Museum at Washington and in the museum of the Arboretum of Harvard College. It was found necessary, in order to secure proper material upon which to carry out the various experiments, to obtain a much larger amount of wood of the different species than was actually consumed in the experiments. This surplus material has been worked into 12,961 museum specimens, of convenient size, showing as far as possible the bark, sap, and heart-wood of each species. These have been made into sixty sets, more or less complete, and distributed to the following educational institutions in the United States and Europe:

Institute of Technology, Boston, Massachusetts.  
United States Military Academy, West Point, New York.  
Academy of Natural Science, Philadelphia, Pennsylvania.  
United States Naval Academy, Annapolis, Maryland.  
Sheffield Scientific School, New Haven, Connecticut.  
School of Mines, Columbia College, New York, New York.  
National School of Forestry, Nancy, France.  
Museum of Science and Art, Edinburgh, Scotland.  
Agricultural Museum, Rome, Italy.  
Brown University, Providence, Rhode Island.  
Rensselaer Polytechnic Institute, Troy, New York.  
Lawrence Scientific School, Cambridge, Massachusetts.  
Iowa Agricultural College, Ames, Iowa.  
Administration of National Forests, Lisbon, Portugal.  
National Forest Administration, Paris, France.  
McGill University, Montreal, Canada.  
Royal Botanic Gardens, Sydney, New South Wales.  
State Agricultural College, Lansing, Michigan.

Peabody Academy of Science, Salem, Massachusetts.  
 Arkansas Industrial University, Fayetteville, Arkansas.  
 Imperial Botanic Gardens, St. Petersburg, Russia.  
 American Society of Civil Engineers, New York, New York.  
 Portland Society of Natural History, Portland, Maine.  
 New Jersey Agricultural College, New Brunswick, New Jersey.  
 State Agricultural College, Burlington, Vermont.  
 State Agricultural College, College Station, Maryland.  
 Union College Engineering School, Schenectady, New York.  
 Cornell University, Ithaca, New York.  
 Hampton Agricultural and Normal Institute, Hampton, Virginia.  
 Pennsylvania State College, State College, Pennsylvania.  
 Ohio State University, Columbus, Ohio.  
 Agricultural College of Missouri, Columbia, Missouri.  
 University of Wisconsin, Madison, Wisconsin.  
 State Agricultural and Mechanical College, Auburn, Alabama.  
 University of Minnesota, Minneapolis, Minnesota.  
 North Carolina Agricultural College, Chapel Hill, North Carolina.  
 West Virginia University, Morgantown, West Virginia.  
 State Agricultural College, Orono, Maine.  
 Georgia Agricultural College, Athens, Georgia.  
 Massachusetts Agricultural College, Amherst, Massachusetts.  
 Tennessee Agricultural College, Knoxville, Tennessee.  
 New Hampshire College of Agriculture, Hanover, New Hampshire.  
 Illinois Industrial University, Champaign, Illinois.  
 State Agricultural College, Corvallis, Oregon.  
 State Agricultural College, Manhattan, Kansas.  
 Agricultural College of Mississippi, Starkville, Mississippi.  
 Kentucky Agricultural College, Lexington, Kentucky.  
 Claflin University, Orangeville, South Carolina.  
 Purdue University, Lafayette, Indiana.  
 Botanic Garden, Königsberg, Germany.  
 Engineer's office, Water-works, Boston, Massachusetts.  
 Franklin Society, Providence, Rhode Island.  
 Madison University, Hamilton, New York.  
 Rochester University, Rochester, New York.  
 Colby Academy, New London, New Hampshire.

#### SPECIFIC GRAVITY AND ASH.

The specific gravity and the ash of every tree of the United States have been determined (Table I) by Mr. Sharples, with the exception of the following: *Olusia flava*, once detected upon the keys of southern Florida, but not rediscovered; *Gordonia pubescens*, a rare and local species discovered in the last century upon the banks of the Altamaha river of Georgia and never rediscovered; *Pistacia Mexicana* and *Acacia Berlandieri*, economically unimportant species of the valley of the lower Rio Grande; *Crataegus berberifolia*, a little known species of the Red River valley; *Cupressus Macnabiana*, a rare and local species of California of little economic importance, and *Larix Iyallii*, a rare and local species of the northern Rocky mountains.

At least two determinations of specific gravity have been made for each species studied, and, in the case of woods of commercial importance, specimens were taken from many trees growing in widely different parts of the country, and under different conditions of soil and climate.

The specimens used for specific gravity determinations were made 100 millimeters long and about 35 millimeters square, and were dried at 100° centigrade until they ceased to lose weight. The specific gravity was then obtained by measurement with micrometer calipers and calculation from the weights of the blocks.

Two determinations of ash were made from each specimen studied by burning small, dried blocks in a muffle furnace at a low temperature.

An average of the specific gravity and of the ash of all the specimens taken from the same tree was made, and the average of these averages is given as the final result for the species; equal weight is thus given to each tree in the calculations without regard to the number of specimens representing it.

In the following table the trees of the United States are arranged in the order of the weight of the dry wood:

Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.
43	<i>Condalia ferrera</i>	1.3020	103	<i>Guettarda elliptica</i>	0.8337	402	<i>Larix occidentalis</i>	0.7407
44	<i>Condalia obovata</i>	1.1999	159	<i>Viburnum prunifolium</i>	0.8332	273	<i>Quercus coccinea</i>	0.7405
140	<i>Rhizophora Mangle</i>	1.1617	26	<i>Ptelia trifoliata</i>	0.8319	87	<i>Gleditschia monosperma</i>	0.7342
20	<i>Gnaphalium sanctum</i>	1.1432	119	<i>Pyrus rivularis</i>	0.8316	77	<i>Robinia Pseudacacia</i>	0.7333
114	<i>Vauquelinia Torreyi</i>	1.1374	277	<i>Quercus lyrata</i>	0.8313	276	<i>Quercus nigra</i>	0.7324
147	<i>Eugenia longipes</i>	1.1235	202	<i>Ostrya Virginica</i>	0.8284	158	<i>Viburnum Lentago</i>	0.7303
21	<i>Portiera angustifolia</i>	1.1101	270	<i>Quercus agrifolia</i>	0.8253	278	<i>Quercus Catesbaei</i>	0.7294
220	<i>Subastinnia lucida</i>	1.0905	244	<i>Carya tomentosa</i>	0.8218	178	<i>Bumelia tenax</i>	0.7293
183	<i>Mimusops Siobori</i>	1.0838	245	<i>Carya porcina</i>	0.8217	130	<i>Cratægus cordata</i>	0.7293
115	<i>Cercocarpus ledifolius</i>	1.0731	49	<i>Colubrina reclinata</i>	0.8208	228	<i>Celtis occidentalis</i>	0.7287
42	<i>Reynosia latifolia</i>	1.0715	106	<i>Prunus umbellata</i>	0.8203	203	<i>Carpinus Caroliniana</i>	0.7285
80	<i>Olneya Tesota</i>	1.0602	151	<i>Cornus florida</i>	0.8153	31	<i>Swietenia Mahogoni</i>	0.7282
30	<i>Amyris sylvatica</i>	1.0459	54	<i>Sapindus marginatus</i>	0.8126	228	<i>Celtis occidentalis, var. reticulata</i>	0.7275
162	<i>Genipa clusifolia</i>	1.0316	201	<i>Osmanthus Americanus</i>	0.8111	35	<i>Ilex Cassine</i>	0.7270
176	<i>Sideroxylon Mastichodendron</i>	1.0109	243	<i>Carya sulcata</i>	0.8108	225	<i>Ulmus racemosa</i>	0.7263
204	<i>Quercus grisea</i>	1.0092	78	<i>Robinia viscosa</i>	0.8094	222	<i>Ulmus crassifolia</i>	0.7245
141	<i>Conocarpus erecta</i>	0.9900	204	<i>Bourreria Havanensis</i>	0.8073	280	<i>Quercus aquatica</i>	0.7244
12	<i>Canella alba</i>	0.9893	259	<i>Quercus Michauxii</i>	0.8039	103	<i>Prunus Americana</i>	0.7215
83	<i>Sophora secundiflora</i>	0.9842	79	<i>Robinia Neo-Mexicana</i>	0.8034	126	<i>Cratægus Crus-galli</i>	0.7194
213	<i>Coccoloba Floridana</i>	0.9835	247	<i>Carya myristiciformis</i>	0.8016	196	<i>Fraxinus quadrangulata</i>	0.7184
113	<i>Prunus ilicifolia</i>	0.9803	284	<i>Quercus hypoleuca</i>	0.8009	241	<i>Carya oliviformis</i>	0.7180
214	<i>Coccoloba uvifera</i>	0.9635	182	<i>Bumelia cuneata</i>	0.7959	407	<i>Thrinax argentea</i>	0.7172
56	<i>Hypelato paniculata</i>	0.9533	128	<i>Cratægus subvillosa</i>	0.7953	170	<i>Kalmia latifolia</i>	0.7160
266	<i>Quercus Durandii</i>	0.9507	372	<i>Pinus serotina</i>	0.7942	132	<i>Cratægus spathulata</i>	0.7159
267	<i>Quercus virens</i>	0.9501	73	<i>Rhus Metopium</i>	0.7917	16	<i>Fremontia Californica</i>	0.7142
265	<i>Quercus reticulata</i>	0.9470	184	<i>Diospyros Virginiana</i>	0.7908	142	<i>Laguncularia racemosa</i>	0.7137
148	<i>Eugenia procera</i>	0.9453	189	<i>Fraxinus Greggii</i>	0.7904	338	<i>Juniperus occidentalis, var. monosperma</i>	0.7118
263	<i>Quercus oblongifolia</i>	0.9441	100	<i>Prunus Capuli</i>	0.7879	104	<i>Fraxinus viridis</i>	0.7117
97	<i>Acacia Wrightii</i>	0.9392	271	<i>Quercus Wislizeni</i>	0.7855	202	<i>Cordia Sebestena</i>	0.7108
110	<i>Cercocarpus parvifolius</i>	0.9365	137	<i>Amelanchior Canadensis</i>	0.7838	167	<i>Arbutus Xalapensis</i>	0.7099
144	<i>Eugenia buxifolia</i>	0.9360	135	<i>Cratægus flava</i>	0.7809	166	<i>Arbutus Menziesii</i>	0.7052
175	<i>Chrysophyllum oliviforme</i>	0.9300	41	<i>Scheffleria frutescens</i>	0.7745	117	<i>Pyrus coronaria</i>	0.7048
219	<i>Drypetes crocea, var. latifolia</i>	0.9346	234	<i>Maclura aurantiaca</i>	0.7736	274	<i>Quercus tinctoria</i>	0.7045
136	<i>Pteromeles arbutifolia</i>	0.9320	233	<i>Morus microphylla</i>	0.7715	380	<i>Pinus palustris</i>	0.6999
177	<i>Dipholis salicifolia</i>	0.9310	102	<i>Chrysobalanus Icaco</i>	0.7700	11	<i>Capparis Jamaicensis</i>	0.6971
160	<i>Exostemma Caribæum</i>	0.9310	122	<i>Cratægus villosa</i>	0.7703	223	<i>Ulmus fulva</i>	0.6958
209	<i>Quercus Emoryi</i>	0.9263	216	<i>Noctandra Willdonoviana</i>	0.7693	110	<i>Prunus demissa</i>	0.6951
95	<i>Leucaena glauca</i>	0.9235	135	<i>Cratægus flava, var. pubescens</i>	0.7683	123	<i>Cratægus Douglasii</i>	0.6950
210	<i>Drypetes crocea</i>	0.9200	281	<i>Quercus laurifolia</i>	0.7673	174	<i>Jacquinia armillaris</i>	0.6948
32	<i>Ximelia Americana</i>	0.9190	258	<i>Quercus bicolor</i>	0.7662	279	<i>Quercus palustris</i>	0.6938
146	<i>Eugenia monticola</i>	0.9156	93	<i>Prosopis juliflora</i>	0.7652	85	<i>Gymnocladus Canadensis</i>	0.6934
211	<i>Avicennia nitida</i>	0.9138	192	<i>Fraxinus Americana, var. Texensis</i>	0.7636	277	<i>Quercus falcata</i>	0.6923
57	<i>Hypelato trifoliata</i>	0.9102	129	<i>Cratægus tomentosa, var. Texensis</i>	0.7633	64	<i>Acer saccharinum, var. nigrum</i>	0.6915
272	<i>Quercus rubra, var. Texana</i>	0.9080	299	<i>Botula lenta</i>	0.7617	64	<i>Acer saccharinum</i>	0.6912
161	<i>Pithecolobium Unguis-cati</i>	0.9049	164	<i>Vaccinium arboreum</i>	0.7610	338	<i>Juniperus occidentalis, var. conjugens</i>	0.6907
40	<i>Mygalea pallens</i>	0.9048	94	<i>Prosopis pubescens</i>	0.7609	63	<i>Acer grandidentatum</i>	0.6902
24	<i>Xanthoxylum Caribæum</i>	0.9002	246	<i>Carya amara</i>	0.7552	118	<i>Pyrus angustifolia</i>	0.6895
112	<i>Prunus sphaerocarpa</i>	0.8995	285	<i>Quercus imbricaria</i>	0.7529	27	<i>Canotia holocantha</i>	0.6885
143	<i>Calyptanthus Chytraculia</i>	0.8992	92	<i>Cercis reniformis</i>	0.7513	104	<i>Prunus angustifolia</i>	0.6884
145	<i>Eugenia dichotoma</i>	0.8983	381	<i>Pinus Cubensis</i>	0.7504	291	<i>Fagus ferruginea</i>	0.6883
262	<i>Quercus Douglasii</i>	0.8928	168	<i>Arbutus Texana</i>	0.7500	138	<i>Hamamelis Virginica</i>	0.6856
75	<i>Eysenhardtia orthocarpa</i>	0.8740	165	<i>Andromeda ferruginea</i>	0.7500	282	<i>Quercus heterophylla</i>	0.6854
81	<i>Piscidia Erythrina</i>	0.8734	200	<i>Quercus Prinus</i>	0.7499	287	<i>Quercus densiflora</i>	0.6827
210	<i>Citharexylum villosum</i>	0.8710	226	<i>Ulmus alata</i>	0.7491	191	<i>Fraxinus pistaciifolia</i>	0.6810
111	<i>Prunus Caroliniana</i>	0.8688	152	<i>Cornus Nuttallii</i>	0.7451	124	<i>Cratægus brachyacantha</i>	0.6793
127	<i>Cratægus coccinea</i>	0.8618	286	<i>Quercus Phellos</i>	0.7472	203	<i>Cordia Boissieri</i>	0.6790
261	<i>Quercus prinoides</i>	0.8605	251	<i>Quercus alba</i>	0.7470	37	<i>Cyrilla racemiflora</i>	0.6784
173	<i>Ardisia Pickeringia</i>	0.8602	181	<i>Bumelia lycioides</i>	0.7467	397	<i>Abies bracteata</i>	0.6783
98	<i>Aecia Greggii</i>	0.8550	169	<i>Oxydendrum arboreum</i>	0.7458	86	<i>Gleditschia triacanthos</i>	0.6740
84	<i>Sophora affinis</i>	0.8509	131	<i>Cratægus apifolia</i>	0.7453	96	<i>Leucaena pulverulenta</i>	0.6732
208	<i>Quercus chrysolepis</i>	0.8493	253	<i>Quercus Garryana</i>	0.7449	250	<i>Myrica Californica</i>	0.6703
185	<i>Diospyros Texana</i>	0.8469	256	<i>Quercus macrocarpa</i>	0.7453	150	<i>Cornus alternifolia</i>	0.6696
255	<i>Quercus undulata, var. Gambelii</i>	0.8407	89	<i>Parkinsonia microphylla</i>	0.7453	460	<i>Yucca canaliculata</i>	0.6677
242	<i>Carya alba</i>	0.8372	25	<i>Xanthoxylum Pterota</i>	0.7444	61	<i>Acer circinatum</i>	0.6660
55	<i>Sapindus Saponaria</i>	0.8367	36	<i>Ilex decidua</i>	0.7420	180	<i>Bumelia spinosa</i>	0.6603
254	<i>Quercus obtusiloba</i>	0.8367	282	<i>Quercus lobata</i>	0.7409	199	<i>Fraxinus anomala</i>	0.6597
172	<i>Myrsine Rapanoa</i>	0.8341	248	<i>Carya aquatica</i>	0.7407	39	<i>Euonymus atropurpureus</i>	0.6592

Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.
184	<i>Crataegus aestivalis</i>	0. 6564	187	<i>Halesia diptera</i>	0. 5705	379	<i>Pinus Banksiana</i>	0. 4701
240	<i>Juglans rupestris</i>	0. 6554	235	<i>Platanus occidentalis</i>	0. 5678	346	<i>Torreya Californica</i>	0. 4700
297	<i>Betula lutea</i>	0. 6553	353	<i>Pinus Parryana</i>	0. 5675	309	<i>Salix lasiandra</i>	0. 4756
170	<i>Bumelia lanuginosa</i>	0. 6544	47	<i>Rhamnus Purshiana</i>	0. 5672	231	<i>Ficus pedunculata</i>	0. 4789
192	<i>Fraxinus Americana</i>	0. 6543	356	<i>Pinus monophylla</i>	0. 5668	237	<i>Platanus Wrightii</i>	0. 4736
272	<i>Quercus rubra</i>	0. 6540	22	<i>Xanthoxylum Americanum</i>	0. 5654	14	<i>Gordonia Lasianthus</i>	0. 4728
88	<i>Parkinsonia Torreyana</i>	0. 6531	249	<i>Myrica cerifera</i>	0. 5637	361	<i>Pinus ponderosa</i>	0. 4715
212	<i>Pisonia obtusata</i>	0. 6529	188	<i>Halesia tetraptera</i>	0. 5628	400	<i>Abies magnifica</i>	0. 4701
218	<i>Umbellularia Californica</i>	0. 6517	316	<i>Salix lasiolepis</i>	0. 5587	3	<i>Magnolia acuminata</i>	0. 4699
354	<i>Pinus cembroides</i>	0. 6512	374	<i>Pinus clausa</i>	0. 5570	333	<i>Cupressus Govoniiana</i>	0. 4689
224	<i>Ulmus Americana</i>	0. 6506	288	<i>Castanopsis chrysophylla</i>	0. 5574	304	<i>Alnus serrulata</i>	0. 4696
125	<i>Crataegus arborescens</i>	0. 6491	357	<i>Pinus Balfouriana, var. aristata</i>	0. 5572	310	<i>Populus grandidentata</i>	0. 4682
205	<i>Ehretia elliptica</i>	0. 6440	76	<i>Dalea spinosa</i>	0. 5530	325	<i>Populus Fremontii, var. Wislizenii</i>	0. 4621
275	<i>Quercus Kelloggii</i>	0. 6435	336	<i>Juniperus Californica, var. Utahensis</i>	0. 5522	331	<i>Chamaecyparis Lawsoniana</i>	0. 4621
215	<i>Persea Carolinensis</i>	0. 6429	45	<i>Rhamnus Caroliniana</i>	0. 5492	157	<i>Sambucus Mexicana</i>	0. 4614
69	<i>Rhus cotinoides</i>	0. 6425	66	<i>Acer rubrum, var. Drummondii</i>	0. 5459	153	<i>Nyssa epitata</i>	0. 4613
283	<i>Quercus cinerea</i>	0. 6420	363	<i>Pinus Chihuahuana</i>	0. 5437	305	<i>Alnus incana</i>	0. 4607
100	<i>Lysiloma latifolia</i>	0. 6418	120	<i>Pyrus Americana</i>	0. 5451	309	<i>Salix lasiandra, var. Fendleriana</i>	0. 4598
230	<i>Ficus brevifolia</i>	0. 6398	370	<i>Pinus Taeda</i>	0. 5441	332	<i>Picea nigra</i>	0. 4584
215	<i>Persea Carolinensis, var. palustris</i>	0. 6396	357	<i>Pinus Balfouriana</i>	0. 5434	368	<i>Pinus insignis</i>	0. 4574
343	<i>Taxus brevifolia</i>	0. 6391	313	<i>Salix flavescens, var. Scouleriana</i>	0. 5412	391	<i>Pseudotsuga Douglasii, var. macrocarpa</i>	0. 4563
355	<i>Pinus edulis</i>	0. 6388	161	<i>Pinckneya pubens</i>	0. 5350			
200	<i>Chionanthus Virginica</i>	0. 6372	314	<i>Salix Hookeriana</i>	0. 5350	309	<i>Abies nobilis</i>	0. 4561
01	<i>Cercis Canadensis</i>	0. 6363	310	<i>Salix longifolia, var. exigua</i>	0. 5342	309	<i>Salix lasiandra, var. lanifolia</i>	0. 4547
1	<i>Magnolia grandiflora</i>	0. 6360	59	<i>Acer spicatum</i>	0. 5330	340	<i>Taxodium distichum</i>	0. 4543
154	<i>Nyssa sylvatica</i>	0. 6356	186	<i>Symplocos tinctoria</i>	0. 5325	50	<i>Zesulus glabra</i>	0. 4542
199	<i>Forestiera acuminata</i>	0. 6345	5	<i>Magnolia macrophylla</i>	0. 5309	17	<i>Tilia Americana</i>	0. 4525
344	<i>Taxus Florida</i>	0. 6340	373	<i>Pinus inops</i>	0. 5309	290	<i>Castanea vulgaris, var. Americana</i>	0. 4504
53	<i>Ungnadia speciosa</i>	0. 6332	58	<i>Acer Pennsylvanicum</i>	0. 5299	107	<i>Prunus emarginata</i>	0. 4502
209	<i>Cresecentia cucurbitina</i>	0. 6319	227	<i>Plamera aquatica</i>	0. 5294	307	<i>Salix amygdaloides</i>	0. 4502
198	<i>Fraxinus sambucifolia</i>	0. 6318	71	<i>Rhus copallina</i>	0. 5273	6	<i>Magnolia Umbrella</i>	0. 4487
171	<i>Rhododendron maximum</i>	0. 6303	65	<i>Acer dasycarpum</i>	0. 5269	200	<i>Catalpa bignonioides</i>	0. 4474
396	<i>Juniperus Californica</i>	0. 6282	362	<i>Pinus Jeffreyi</i>	0. 5206	411	<i>Yucca elata</i>	0. 4470
82	<i>Cladrastis tinctoria</i>	0. 6278	155	<i>Nyssa uniflora</i>	0. 5194	306	<i>Salix nigra</i>	0. 4456
332	<i>Cupressus macrocarpa</i>	0. 6261	71	<i>Rhus copallina, var. lanceolata</i>	0. 5184	390	<i>Tanga Pattoniana</i>	0. 4454
103	<i>Fraxinus pubescens</i>	0. 6251	389	<i>Tsuga Mertensiana</i>	0. 5182	404	<i>Sabal Palmotto</i>	0. 4404
38	<i>Chiftonia ligustrina</i>	0. 6249	405	<i>Washingtonia filifera</i>	0. 5173	311	<i>Salix sessilifolia</i>	0. 4397
401	<i>Larix Americana</i>	0. 6236	391	<i>Pseudotsuga Douglasii</i>	0. 5157	72	<i>Rhus venenata</i>	0. 4382
66	<i>Acer rubrum</i>	0. 6178	371	<i>Pinus rigida</i>	0. 5151	350	<i>Pinus flexilis</i>	0. 4358
90	<i>Parkinsonia aculeata</i>	0. 6116	345	<i>Torreya taxifolia</i>	0. 5145	70	<i>Rhus typhina</i>	0. 4357
239	<i>Juglans nigra</i>	0. 6115	156	<i>Sambucus glauca</i>	0. 5087	67	<i>Negundo aceroides</i>	0. 4328
377	<i>Pinus mitis</i>	0. 6104	317	<i>Salix Hitchensis</i>	0. 5072	386	<i>Picea Sitohensis</i>	0. 4287
315	<i>Salix cordata, var. vestita</i>	0. 6069	23	<i>Xanthoxylum Clava-Herculis</i>	0. 5056	388	<i>Tsuga Caroliniana</i>	0. 4275
408	<i>Oreodoxa regia</i>	0. 6034	10	<i>Anona laurifolia</i>	0. 5053	51	<i>Zesulus flava</i>	0. 4274
299	<i>Betula occidentalis</i>	0. 6030	217	<i>Sassafras officinale</i>	0. 5042	312	<i>Salix discolor</i>	0. 4261
62	<i>Acer glabrum</i>	0. 6028	360	<i>Pinus Arizona</i>	0. 5038	18	<i>Tilia heterophylla</i>	0. 4253
40	<i>Rhamnus Californica</i>	0. 6000	2	<i>Magnolia glauca</i>	0. 5035	387	<i>Tsuga Canadensis</i>	0. 4239
406	<i>Thrinax parviflora</i>	0. 5991	105	<i>Prunus Pennsylvanica</i>	0. 5023	8	<i>Liriodendron Tulipifera</i>	0. 4230
23	<i>Xanthoxylum Clava-Herculis, var. fruticosum</i>	0. 5967	7	<i>Magnolia Fraseri</i>	0. 5003	398	<i>Abies amabilis</i>	0. 4228
205	<i>Betula papyrifera</i>	0. 5955	52	<i>Alnus maritima</i>	0. 4996	342	<i>Sequoia sempervirens</i>	0. 4208
121	<i>Pyrus sambucifolia</i>	0. 5928	313	<i>Zesulus Californica</i>	0. 4980	207	<i>Catalpa speciosa</i>	0. 4165
130	<i>Liquidambar Styraciflua</i>	0. 5909	376	<i>Salix flavescens</i>	0. 4969	351	<i>Pinus albicanis</i>	0. 4165
208	<i>Chilopsis saligna</i>	0. 5902	375	<i>Pinus muricata</i>	0. 4942	321	<i>Populus balsamifera, var. canadensis</i>	0. 4161
232	<i>Morus rubra</i>	0. 5898	310	<i>Pinus pungens</i>	0. 4935	4	<i>Magnolia cordata</i>	0. 4139
10	<i>Byrsonima lucida</i>	0. 5888	339	<i>Salix longifolia</i>	0. 4930	28	<i>Simaruba glauca</i>	0. 4136
289	<i>Castanea pumila</i>	0. 5887	325	<i>Juniperus Virginiana</i>	0. 4920	367	<i>Pinus Coulteri</i>	0. 4133
34	<i>Ilex Dahoon, var. myrtifolia</i>	0. 5873	60	<i>Populus Fremontii</i>	0. 4914	392	<i>Alnus rhombifolia</i>	0. 4127
337	<i>Juniperus pachyphloea</i>	0. 5829	236	<i>Acer macrophyllum</i>	0. 4909	365	<i>Pinus Murrayana</i>	0. 4096
108	<i>Prunus serotina</i>	0. 5822	359	<i>Platanus racemosa</i>	0. 4880	320	<i>Populus heterophylla</i>	0. 4089
33	<i>Ilex opaca</i>	0. 5818	352	<i>Pinus Torreyana</i>	0. 4879	238	<i>Juglans cinerea</i>	0. 4086
364	<i>Pinus contorta</i>	0. 5815	308	<i>Pinus reflexa</i>	0. 4877	17	<i>Tilia Americana, var. pubescens</i>	0. 4074
194	<i>Fraxinus viridis, var. Berlandieriana</i>	0. 5780	353	<i>Salix levigata</i>	0. 4872	383	<i>Picea alba</i>	0. 4051
221	<i>Hippomane Mancinella</i>	0. 5772	335	<i>Pinus resinosa</i>	0. 4854	318	<i>Populus tremuloides</i>	0. 4032
338	<i>Juniperus occidentalis</i>	0. 5765	366	<i>Cupressus Guadalupensis</i>	0. 4843	326	<i>Libocedrus decurrens</i>	0. 4017
298	<i>Betula nigra</i>	0. 5762	68	<i>Pinus Sabiniana</i>	0. 4840	303	<i>Alnus oblongifolia</i>	0. 3981
294	<i>Betula alba, var. populifolia</i>	0. 5760	301	<i>Negundo Californicum</i>	0. 4821	9	<i>Asimina triloba</i>	0. 3969
48	<i>Ceanothus thyrsiflorus</i>	0. 5750	34	<i>Alnus rubra</i>	0. 4813	378	<i>Pinus glabra</i>	0. 3931
197	<i>Fraxinus Oregona</i>	0. 5731	330	<i>Ilex Dahoon</i>	0. 4806	322	<i>Populus angustifolia</i>	0. 3912
				<i>Chamaecyparis Nutkaensis</i>	0. 4782	348	<i>Pinus monticola</i>	0. 3908

Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.	Catalogue number.	Species.	Relative specific gravity.
324	<i>Populus monilifera</i> .....	0.3839	396	<i>Abies concolor</i> .....	0.3638	329	<i>Chamaecyparis sphaeroides</i> .....	0.3322
347	<i>Pinus Strobus</i> .....	0.3854	321	<i>Populus balsamifera</i> .....	0.3635	149	<i>Cereus giganteus</i> .....	0.3188
393	<i>Abies balsamea</i> .....	0.3819	392	<i>Abies Fraseri</i> .....	0.3505	327	<i>Thuja occidentalis</i> .....	0.3164
323	<i>Populus trichocarpa</i> .....	0.3614	395	<i>Abies grandis</i> .....	0.3545	29	<i>Bursera gummifera</i> .....	0.3003
328	<i>Thuja gigantea</i> .....	0.3796	195	<i>Fraxinus platycarpa</i> .....	0.3541	341	<i>Sequoia gigantea</i> .....	0.2882
385	<i>Picea pungens</i> .....	0.3740	360	<i>Pinus tuberculata</i> .....	0.3499	412	<i>Yucca baccata</i> .....	0.2724
410	<i>Yucca brevifolia</i> .....	0.3737	394	<i>Abies subalpina</i> .....	0.3476	229	<i>Ficus aurea</i> .....	0.2616
340	<i>Pinus Lambertiana</i> .....	0.3684	384	<i>Picea Engelmanni</i> .....	0.3449			

It will be noticed that all species in which the wood is heavier than water belong to the semi-tropical region of Florida or to the arid Mexican and interior Pacific regions. There seems to be a certain, but by no means constant relation, as shown in this table, between aridity of climate and the weight of the wood produced by closely allied species or by individuals of the same species. The wood of the form of *Quercus rubra* peculiar to western Texas is nearly 39 per cent. heavier than the average of all the specimens of the typical species grown in the northern states. Among the white oaks the wood of species belonging to regions of little rainfall, *Quercus grisea*, *oblongifolia*, *Durandii*, and *Douglasii*, is heavier than that of allied species peculiar to regions more favorable for the growth of trees. The average of two specimens of *Quercus prinoides* grown in western Texas is 19 per cent. heavier than the average of all the other specimens of this species grown in other parts of the country. In *Fraxinus*, the wood of *F. Greggii* of the Rio Grande valley is heavier than that of any other species; it only just surpasses in weight, however, the wood of the western Texas form of *F. Americana*, which is 20 per cent. heavier than the average of all specimens of the typical species grown north of Texas. On the other hand, the wood of Texas forms of *Fraxinus viridis* is constantly lighter than that of northern specimens, and the wood of *Celtis* grown in Arizona is lighter than that of the average of all the other specimens of this species. In *Juglans*, the heaviest wood is that of *J. rupestris*, a species belonging to a region of little rainfall, and a specimen of *J. nigra* from western Texas is 33 per cent. heavier than the average of all specimens grown in the Mississippi basin. In the case of *Platanus*, the heaviest wood is that of the Atlantic species, but wood of the species peculiar to the comparatively moist climate of southwestern Arizona is, however, considerably lighter than that of the drier climate of southern California.

FUEL VALUE.

The relative fuel values are obtained by deducting the percentage of ash from the specific gravity, and are based on the hypothesis that the real value of the combustible material in all woods is the same.

A number of analyses was also made of the wood of several of the principal trees of the United States (Table II) and their absolute fuel value calculated. Mr. Sharples describes the methods adopted by him to obtain these results, as follows:

The carbon and hydrogen determinations were made by the ordinary processes of organic analysis, by burning the wood in a current of oxygen. The moisture was determined by drying the wood at 100° centigrade until its weight became sensibly constant. The calculations were then made on the dry wood. The results contain a slight constant error, arising from the fact that the nitrogen in the wood was not determined. This error is, however, very slight, the nitrogen, which is included in the percentage of oxygen, rarely amounting, in any wood, to one per cent. The column headed "Hydrogen combined with oxygen", is found by dividing the amount in the column headed "Oxygen" by eight, and represents the hydrogen that may be considered as already combined with oxygen in the form of water, and is therefore useless for fuel. The fuel value per kilogram is found by multiplying the percentage of carbon by 8,080, and that of excess of hydrogen by 34,462 (these being the values obtained by *Favre* and *Silberman*), adding these together and deducting from the sum the product of the total hydrogen multiplied by 4,833, which represents the heat required to evaporate the water produced by burning the hydrogen. The constants used above represent the number of kilograms of water raised one degree centigrade, by burning one kilogram of carbon or hydrogen. The fuel value per cubic decimeter is found by multiplying the value per kilogram by the specific gravity. It need hardly be said that this fuel value is rarely attained in practice, and that it is never utilized. There are too many sources of loss; the calculation supposes that the combustion is perfect, that no smoke is given off, and that the heat of the products of combustion, with the exception of that necessary to convert the water into vapor, is all utilized.

It appears from Mr. Sharples' experiments that resinous woods give upward of 12 per cent. more heat from equal weights burned than non-resinous woods; the heat produced by burning a kilogram of dry non-resinous wood being about 4,000 units, while the heat produced by burning a kilogram of dry resinous wood is about 4,500 units, a unit being the quantity of heat required to raise 1 kilogram of water 1 degree centigrade.

Count Rumford first propounded the theory that the value of equal weights of wood for fuel was the same without reference to specific distinctions; that is, that a pound of wood, whatever the variety, would always produce the same amount of heat (*Count Rumford's Works*, Boston, 1873, vol. ii). Marcus Bull, experimenting in 1826 upon the fuel value of different woods (*Trans. Am. Phil. Soc.*, new ser., iii, 1), found a variation of only 11 per cent. between the different species tested. Rumford's theory must be regarded as nearly correct, if woods are

separated into resinous and non-resinous classes. The specific gravity gives a direct means of comparing heat values of equal volumes of wood of different resinous and non-resinous species. In burning wood, however, various circumstances affect its value; few fire-places are constructed to fully utilize the fuel value of resinous wood, and carbon escapes unconsumed in the form of smoke. Pine, therefore, which, although capable of yielding more heat than oak or hickory, may in practice yield considerably less, the pine losing both carbon and hydrogen in the form of smoke, while hickory or oak, burning with a smokeless flame, is practically entirely consumed. The ash in a wood, being non-combustible, influences its fuel value in proportion to its amount. The state of dryness of wood also has much influence upon its fuel value, though to a less degree than is generally supposed. The water in green wood prevents its rapid combustion, evaporation reducing the temperature below the point of ignition. Green wood may often contain as much as 50 per cent. of water, and this water must evaporate during combustion; but as half a kilogram of ordinary wood will give 2,000 units of heat, while half a kilogram of water requires only 268.5 units to evaporate it, 1731.5 units remain available for generating heat in wood containing even a maximum amount of water. In cases where the pressure was perpendicular to the grain of the wood it was applied on the side of the specimen nearest to the heart of the tree.

A factor in the general value of wood as fuel is the ease with which it can be seasoned; beech, for example, a very dense wood of high fuel value when dried, is generally considered of little value as fuel, on account of the rapidity with which it decays when cut and the consequent loss of carbon by decomposition.

### THE STRENGTH OF WOOD.

The specimens tested for the purpose of determining the strength of the wood produced by the different trees of the United States were cut, with few exceptions, before March, 1881, and were slowly and carefully seasoned.

Those used in determining the resistance to transverse strain were made 4 centimeters square and long enough to give the necessary bearing upon the supports. These were shod with flat iron plates, slightly rounded on the edges and were set exactly 1 meter apart; they remained perfectly rigid under the pressure applied. Each specimen was weighed, measured, and its specific gravity calculated before it was tested. The result thus obtained represents the specific gravity of the air-dried wood.

To eliminate the action of their weight the specimens were placed upright, and hydraulic pressure was applied by means of an iron rod 12 millimeters in radius, acting midway between the supports, the deflections being read at this point.

The direction of the grain of the wood is shown by diagrams in the table (Table III), the pressure acting upon it horizontally from the left.

The pressure was applied slowly and uniformly, a reading of the deflections being taken for every 50 kilograms. When a load of 200 kilograms had been applied it was removed and the set read. Pressure was again applied in the same way, and the readings of deflections were resumed when 200 kilograms was again reached.

The formula used in calculating the coefficient of elasticity was  $E = \frac{P l^3}{4 \Delta b d^3}$ ;  $l, b, d$ , being taken in millimeters; that of the modulus of rupture,  $R = \frac{3 P l}{2 b d^2}$ ,  $l, b, d$  being in centimeters,  $P$ , in both formulas, in kilograms.

A few experiments were also made in the same manner, for purposes of comparison, to determine the transverse strength of specimens 1 meter long between the bearings and 8 centimeters square (Table IV).

The specimens tested by longitudinal compression were 4 centimeters square and 32 centimeters (8 diameters) long. They were placed between the platforms of the machine, and pressure was gradually applied until they failed. The figures given represent the number of kilograms required to cause failure.

The specimens tested under pressure applied perpendicularly to the fibers were 4 centimeters square and 16 centimeters long. They were placed upon the platform of the machine and indented with an iron punch 4 centimeters square on its face, covering the entire width of the specimen and one-quarter of its length at the center. In this series of experiments the direction of the annual rings was noted, horizontal pressure being also applied from the left. Readings were taken of the pressure necessary to produce each successive indentation of 0.254 up to 2.54 millimeters, and in the case of specimens which did not fail with this pressure a further test was made of the weight required to produce indentations of 3.81 and 5.08. The remarks (Table V) upon the behavior of the wood of the different species under compression were furnished by Mr. James E. Howard, in charge of the testing machine.

### COMPARATIVE VALUES.

In the following table the number standing opposite each species represents its relative value in the column in which it appears.

This table is purely an arbitrary one, since the introduction of one or more species would of course change the value of all species standing lower in value, or results based on an examination of a larger number of specimens of any species may change the relative numbers in regard to it very considerably. In other words, any twenty or thirty species bearing consecutive numbers may change places with each other. This arises partly from the want of uniformity of the wood of any species, and partly from the fact that where so many determinations fall between comparatively narrow limits the mere order of sequence must be largely accidental.

TABLE OF RELATIVE VALUES.

Catalogue number.	Species.	Approximate fuel value.	Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.	Catalogue number.	Species.	Approximate fuel value.	Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.	
<b>MAGNOLIACEÆ.</b>							<b>ANACARDIACEÆ.</b>							
1	Magnolia grandiflora	145	133	135	115	124	71	Rhus copallina	193	210	205	227	216	
2	Magnolia glauca	205	127	163	173	224	73	Rhus Metopium	59	74	208	73	109	
3	Magnolia acuminata	230	122	201	189	226	<b>LEGUMINOSÆ.</b>							
4	Magnolia cordata	265	119	236	191	248	77	Robinia Pseudacacia	87	19	3	12	71	
5	Magnolia macrophylla	189	41	184	104	247	79	Robinia Neo-Mexicana	51	43	81	16	52	
6	Magnolia Umbrella	249	207	245	234	257	80	Olneya Tesota	7	143	153	235	2	
7	Magnolia Fraseri	207	114	179	182	202	81	Piscidia Erythrina	35	154	151	34	24	
8	Liriodendron Tulipifera	259	124	208	229	262	82	Cladrastris tinctoria	150	95	88	71	141	
<b>ANONACEÆ.</b>							84	Sophora affinis	34	102	121	48	27	
9	Asimina triloba	277	281	293	298	285	85	Gymnocladus Canadensis	114	77	144	200	163	
10	Anona latrifolia	220	278	234	277	198	86	Gleditschia triacanthos	124	64	77	93	156	
<b>CANELACEÆ.</b>							87	Gleditschia monosperma	88	40	49	41	53	
12	Canella alba	11	50	50	0	5	88	Parkinsonia Torreyana	134	264	259	184	80	
<b>TERNSTREMIACEÆ.</b>							91	Cercis Canadensis	146	228	165	123	142	
14	Gordonia Lasianthus	228	187	201	214	240	94	Prosopis juliflora	69	259	273	40	26	
<b>TILIACEÆ.</b>							94	Prosopis pubescens	67	172	91	18	28	
17	Tilia Americana	246	161	241	240	290	<b>ROSACEÆ.</b>							
17	Tilia Americana, var. pubescens	272	183	250	195	298	103	Prunus Americana	97	161	103	89	104	
18	Tilia heterophylla	257	158	248	202	263	104	Prunus angustifolia	119	253	276	107	190	
<b>MALPIGHIACEÆ.</b>							107	Prunus emarginata	248	149	194	124	266	
10	Byrsonima lucida	169	272	288	208	100	108	Prunus serotina	104	153	115	61	114	
<b>ZYGOPHYLLACEÆ.</b>							110	Prunus demissa	112	199	186	84	76	
20	Guaiacum sanctum	3	147	137	10	1	111	Prunus Caroliniana	29	120	76	50	32	
<b>RUTACEÆ.</b>							113	Prunus ilicifolia	10	212	188	63	39	
23	Xanthoxylum Clava-Herculis	204	217	219	148	105	117	Pyrus coronaria	109	245	273	181	74	
24	Xanthoxylum Caribæum	27	143	150	15	18	121	Pyrus sambucifolia	165	248	284	220	225	
<b>SIMARUBEÆ.</b>							125	Cratægus arborescens	185	189	228	95	140	
28	Simaruba glauca	208	121	252	171	251	126	Cratægus Crus-galli	100	240	210	169	107	
<b>BURSERACEÆ.</b>							128	Cratægus subvillosa	52	135	102	68	68	
29	Bursera gummifera	298	292	300	300	300	129	Cratægus tomentosa	65	213	177	153	80	
30	Amyris sylvatica	5	65	2	9	6	132	Cratægus spathulata	102	237	268	189	99	
<b>MELIACEÆ.</b>							134	Cratægus astivalis	128	256	176	152	94	
31	Swietenia Mahogoni	96	71	56	20	36	135	Cratægus flava	61	225	187	76	31	
<b>ILICINEÆ.</b>							187	Amelanchier Canadensis	57	34	24	19	48	
33	Ilex opaca	167	244	188	180	149	<b>HAMAMELACEÆ.</b>							
34	Ilex Dahoon	224	246	250	252	214	189	Liquidambar Styraclifua	162	167	214	128	192	
<b>CYRILLACEÆ.</b>							140	<b>RHIZOPHORACEÆ.</b>						
38	Cliftonia ligustrina	152	191	202	231	177	141	Rhizophora Manglo	2	2	10	2	3	
<b>RHAMNACEÆ.</b>							142	<b>COMBRETACEÆ.</b>						
42	Reynosa latifolia	6	74	116	3	4	141	Conocarpus erecta	9	80	72	32	19	
49	Condalia ferrea	1	45	85	5	3	142	Laguncularia racemosa	108	219	264	147	174	
45	Rhamnus Caroliniana	184	208	251	154	187	<b>MYRTACEÆ.</b>							
47	Rhamnus Purshiana	175	129	152	28	131	144	Eugenia buxifolia	18	6	38	1	20	
<b>SAPINDACEÆ.</b>							146	Eugenia monticola	24	65	15	55	12	
50	Æsculus glabra	245	243	271	273	282	148	Eugenia procera	19	38	14	17	9	
52	Æsculus Californica	208	232	222	246	220	<b>CORNACEÆ.</b>							
54	Sapindus marginatus	47	165	112	122	58	151	Cornus florida	44	176	85	69	40	
60	Acer macrophyllum	213	194	190	223	159	152	Cornus Nuttallii	74	85	60	22	77	
61	Acer circinatum	126	221	147	136	119	153	Nyssa capitata	235	234	194	167	169	
64	Acer saccharinum	117	9	18	30	73	154	Nyssa sylvatica	141	178	112	125	127	
04	Acer saccharinum, var. nigrum	118	88	68	57	66	155	Nyssa uniflora	195	275	210	237	161	
65	Acer dasycarpum	192	59	53	113	145	<b>CAPRIFOLIACEÆ.</b>							
66	Acer rubrum	154	117	121	133	151	156	Sambucus glauca	206	209	295	287	184	
67	Negundo aceroides	256	260	263	270	215	159	Viburnum prunifolium	38	131	69	37	35	
68	Negundo Californicum	221	113	132	155	221	<b>RUBIACEÆ.</b>							
							160	Exostemma Caribæum	15	36	55	8	7	
							161	Pinckneya pubens	187	231	201	289	230	

TABLE OF RELATIVE VALUES—Continued.

Catalogue number.	Species.	Approximate fuel value.	Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.	Catalogue number.	Species.	Approximate fuel value.	Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.
<b>ERICACEÆ.</b>													
165	<i>Andromeda ferruginea</i> .....	72	179	194	107	92	224	<i>Ulmus Americana</i> .....	136	205	110	140	16
160	<i>Arbutus Menziesii</i> .....	107	164	81	89	110	225	<i>Ulmus racemosa</i> .....	93	62	80	38	11
167	<i>Arbutus Xalapensis</i> .....	104	251	230	198	75	226	<i>Ulmus alata</i> .....	80	273	167	158	6
160	<i>Oxydendrum arboreum</i> .....	78	187	164	90	65	227	<i>Planera aquatica</i> .....	191	266	228	203	17
170	<i>Kalmia latifolia</i> .....	101	258	219	168	65	228	<i>Celtis occidentalis</i> .....	94	220	135	178	10
171	<i>Rhododendron maximum</i> .....	148	242	205	156	133	228	<i>Celtis occidentalis, var. reticulata</i> .....	98	143	127	160	1
<b>SAPOTACEÆ.</b>													
175	<i>Chrysophyllum oliviforme</i> .....	17	54	107	33	15	229	<i>Ficus aurea</i> .....	300	300	208	200	20
176	<i>Sideroxylon Mastichodendron</i> .....	12	61	67	23	25	231	<i>Ficus pedunculata</i> .....	244	232	209	284	20
177	<i>Dipholis salicifolia</i> .....	10	16	18	11	49	232	<i>Morus rubra</i> .....	163	173	141	170	14
178	<i>Bumelia tenax</i> .....	90	204	200	143	146	234	<i>Maclura aurantiaca</i> .....	63	114	25	4	2
170	<i>Bumelia lanuginosa</i> .....	133	280	294	239	162	<b>PLATANACEÆ.</b>						
181	<i>Bumelia lycioides</i> .....	81	193	254	106	97	235	<i>Platanus occidentalis</i> .....	173	140	222	144	16
182	<i>Bumelia cuneata</i> .....	56	252	265	117	47	236	<i>Platanus racemosa</i> .....	213	240	254	260	24
183	<i>Mimusops Sieberii</i> .....	4	95	79	135	16	237	<i>Platanus Wrightii</i> .....	231	286	285	267	21
<b>EBENACEÆ.</b>													
184	<i>Diospyros Virginiana</i> .....	55	192	98	88	29	238	<i>Juglans cinerea</i> .....	270	181	238	205	24
<b>STYRACACEÆ.</b>													
186	<i>Symplocos tinctoria</i> .....	190	250	230	218	139	239	<i>Juglans nigra</i> .....	155	63	100	40	12
187	<i>Halesia diptera</i> .....	172	229	107	166	123	240	<i>Juglans rupestris</i> .....	132	218	230	150	14
<b>OLEACEÆ.</b>													
101	<i>Fraxinus pistaciifolia</i> .....	122	254	226	217	108	241	<i>Carya oliviformis</i> .....	103	230	246	164	8
102	<i>Fraxinus Americana</i> .....	130	91	106	121	133	242	<i>Carya alba</i> .....	36	12	11	27	6
192	<i>Fraxinus Americana, var. Texensis</i> .....	66	60	27	65	121	243	<i>Carya sulcata</i> .....	46	78	33	52	4
103	<i>Fraxinus pubescens</i> .....	151	182	101	162	113	244	<i>Carya tomentosa</i> .....	43	42	20	36	6
104	<i>Fraxinus viridis</i> .....	105	133	91	114	98	246	<i>Carya porcina</i> .....	42	92	31	43	4
195	<i>Fraxinus platycarpa</i> .....	201	283	261	296	185	247	<i>Carya amara</i> .....	71	86	30	78	7
196	<i>Fraxinus quadrangulata</i> .....	73	190	121	94	111	248	<i>Carya myristiciformis</i> .....	49	8	1	25	3
197	<i>Fraxinus Oregana</i> .....	171	156	203	80	157	248	<i>Carya aquatica</i> .....	86	93	90	110	6
198	<i>Fraxinus sambucifolia</i> .....	149	142	125	175	130	<b>MYRICACEÆ.</b>						
190	<i>Forestiera acuminata</i> .....	147	227	175	199	154	240	<i>Myrica cerifera</i> .....	177	137	110	151	18
201	<i>Osmanthus Americanus</i> .....	45	28	40	51	64	250	<i>Myrica Californica</i> .....	125	99	46	74	12
<b>BORRAGINACEÆ.</b>													
204	<i>Bourreria Havanaensis</i> .....	53	97	71	45	43	251	<i>Quercus alba</i> .....	76	104	85	82	10
205	<i>Ehretia elliptica</i> .....	142	296	169	215	87	252	<i>Quercus lobata</i> .....	85	222	103	172	18
<b>BIGNONIACEÆ.</b>													
206	<i>Catalpa bignonioides</i> .....	250	233	241	238	273	253	<i>Quercus Garryana</i> .....	70	183	90	97	7
207	<i>Catalpa speciosa</i> .....	263	175	224	194	254	254	<i>Quercus obtusiloba</i> .....	37	169	100	108	6
208	<i>Chalopsis saligna</i> .....	161	267	247	278	181	255	<i>Quercus undulata, var. Gambellii</i> .....	32	262	194	180	6
<b>VERBENACEÆ.</b>													
210	<i>Citharexylum villosum</i> .....	28	26	73	13	37	256	<i>Quercus macrocarpa</i> .....	82	122	65	103	6
<b>NYCTAGINACEÆ.</b>													
212	<i>Pisonia obtusata</i> .....	157	284	206	274	218	257	<i>Quercus lyrata</i> .....	39	17	50	100	7
<b>POLYGONACEÆ.</b>													
213	<i>Coccoloba Florida</i> .....	14	49	78	7	13	258	<i>Quercus bicolor</i> .....	60	131	81	102	6
<b>LAURACEÆ.</b>													
215	<i>Persea Carolinensis</i> .....	138	162	88	47	128	259	<i>Quercus Michauxii</i> .....	48	106	23	112	6
215	<i>Persea Carolinensis, var. palustris</i> .....	140	162	116	232	132	260	<i>Quercus Prinus</i> .....	75	27	48	67	6
217	<i>Sassafras officinale</i> .....	202	273	235	221	188	261	<i>Quercus prinoides</i> .....	31	53	6	44	6
218	<i>Umbellularia Californica</i> .....	131	70	127	49	120	262	<i>Quercus Douglasii</i> .....	26	197	57	53	1
<b>EUPHORBIACEÆ.</b>													
219	<i>Drypetes crocea</i> .....	80	79	132	24	23	263	<i>Quercus oblongifolia</i> .....	20	150	175	165	1
219	<i>Drypetes crocea, var. latifolia</i> .....	25	168	178	70	13	264	<i>Quercus grisea</i> .....	8	209	73	116	2
<b>URTICACEÆ.</b>													
222	<i>Ulmus crassifolia</i> .....	99	226	142	142	68	266	<i>Quercus Durandii</i> .....	21	105	57	70	3
223	<i>Ulmus fulva</i> .....	111	110	101	66	172	267	<i>Quercus virens</i> .....	13	49	54	59	3
							268	<i>Quercus chrysolepis</i> .....	33	33	4	62	3
							269	<i>Quercus Emoryi</i> .....	22	247	180	176	1
							270	<i>Quercus agrifolia</i> .....	41	110	75	131	8
							271	<i>Quercus Wislizeni</i> .....	53	148	118	72	5
							272	<i>Quercus rubra</i> .....	129	48	63	88	15
							272	<i>Quercus rubra, var. Texana</i> .....	23	83	52	43	4
							273	<i>Quercus coccinea</i> .....	84	65	38	87	11
							274	<i>Quercus tinctoria</i> .....	106	81	44	92	11
							275	<i>Quercus Kelloggii</i> .....	137	200	145	149	15
							276	<i>Quercus nigra</i> .....	89	102	43	93	4
							277	<i>Quercus falcata</i> .....	113	11	12	35	11
							278	<i>Quercus Catesbeii</i> .....	91	80	42	137	8
							279	<i>Quercus palustris</i> .....	115	55	32	101	13
							280	<i>Quercus aquatica</i> .....	95	29	40	91	12
							281	<i>Quercus laurifolia</i> .....	62	25	18	77	7

TABLE OF RELATIVE VALUES—Continued.

Catalogue number.	Species.	Approximate fuel value.				Catalogue number.	Species.	Approximate fuel value.					
		Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.			Elasticity.	Ultimate transverse strength.	Ultimate resistance to longitudinal crushing.	Resistance to indentation to 1.27 millimeters.		
282	<i>Quercus heterophylla</i> .....	121	30	35	190	144	347	Pinus Strobus .....	282	154	225	212	278
283	<i>Quercus cinerea</i> .....	144	203	57	150	118	348	<i>Pinus monticola</i> .....	270	112	232	263	288
284	<i>Quercus hypoleuca</i> .....	54	114	29	279	50	349	<i>Pinus Lambertiana</i> .....	287	187	238	202	270
285	<i>Quercus imbricaria</i> .....	68	37	8	56	80	350	<i>Pinus flexilis</i> .....	253	235	227	251	219
286	<i>Quercus Phellos</i> .....	77	190	63	211	102	351	<i>Pinus albicaulis</i> .....	262	276	244	265	224
287	<i>Quercus densiflora</i> .....	123	106	70	119	93	352	<i>Pinus reflexa</i> .....	215	127	143	105	200
288	<i>Castanopsis chrysophylla</i> .....	180	94	153	163	206	353	<i>Pinus Parryana</i> .....	174	207	287	258	129
289	<i>Castanea pumila</i> .....	160	40	60	99	209	355	<i>Pinus edulis</i> .....	143	201	283	253	106
290	<i>Castanea vulgaris, var. Americana</i> .....	247	152	184	232	227	356	<i>Pinus monophylla</i> .....	176	289	297	288	155
291	<i>Fagus ferruginea</i> .....	120	32	18	120	125	357	<i>Pinus Balfouriana</i> .....	185	255	288	260	178
292	<i>Ostrya Virginica</i> .....	40	15	23	64	85	357	<i>Pinus Balfouriana, var. aristata</i> .....	179	223	210	268	189
293	<i>Carpinus Caroliniana</i> .....	92	43	18	96	103	358	<i>Pinus resinosa</i> .....	217	51	181	140	256
BETULACEÆ.													
294	<i>Betula alba, var. populifolia</i> .....	168	214	140	254	190	361	<i>Pinus Torreyana</i> .....	200	270	149	272	180
295	<i>Betula papyrifera</i> .....	159	18	37	109	195	362	<i>Pinus Arizona</i> .....	203	174	210	204	217
296	<i>Betula occidentalis</i> .....	158	126	127	207	171	363	<i>Pinus ponderosa</i> .....	226	140	171	226	222
297	<i>Betula lutea</i> .....	127	3	5	29	160	364	<i>Pinus Jeffreyi</i> .....	201	125	156	185	212
298	<i>Betula nigra</i> .....	170	58	66	157	193	365	<i>Pinus Chihuahuana</i> .....	182	216	114	259	170
299	<i>Betula lenta</i> .....	64	10	9	31	91	366	<i>Pinus contorta</i> .....	166	4	60	54	175
301	<i>Alnus rubra</i> .....	222	72	121	188	210	367	<i>Pinus Murrayana</i> .....	269	198	253	204	253
302	<i>Alnus rhombifolia</i> .....	267	158	190	244	268	368	<i>Pinus Sabiana</i> .....	219	257	130	261	186
303	<i>Alnus oblongifolia</i> .....	276	190	189	285	279	369	<i>Pinus Coulteri</i> .....	266	40	148	233	246
SALICACEÆ.													
307	<i>Salix amygdaloides</i> .....	251	277	257	291	264	372	<i>Pinus insignis</i> .....	239	101	158	183	229
308	<i>Salix lavigata</i> .....	216	280	217	272	208	373	<i>Pinus tuberculata</i> .....	293	290	290	293	255
309	<i>Salix lasandra, var. lanceifolia</i> .....	243	141	199	257	249	374	<i>Pinus Teda</i> .....	183	52	95	170	223
309	<i>Salix lasandra, var. Fendleriana</i> .....	296	298	276	281	261	375	<i>Pinus rigida</i> .....	197	261	158	245	101
313	<i>Salix flavescens</i> .....	209	65	125	192	241	376	<i>Pinus serotina</i> .....	50	39	17	86	42
313	<i>Salix flavescens, var. Scouleriana</i> .....	186	22	81	126	199	377	<i>Pinus inops</i> .....	188	269	207	241	168
316	<i>Salix lasiolepis</i> .....	181	137	120	218	183	378	<i>Pinus clausa</i> .....	178	268	269	228	194
318	<i>Populus tremuloides</i> .....	275	180	198	266	265	379	<i>Pinus pungens</i> .....	211	186	166	247	213
319	<i>Populus grandidentata</i> .....	234	108	169	243	295	380	<i>Pinus muricata</i> .....	210	35	47	85	204
320	<i>Populus heterophylla</i> .....	271	220	218	288	250	381	<i>Pinus mitis</i> .....	156	18	45	118	197
321	<i>Populus balsamifera</i> .....	288	150	257	271	276	382	<i>Pinus glabra</i> .....	278	288	270	280	238
321	<i>Populus balsamifera, var. canadensis</i> .....	264	215	232	286	291	383	<i>Pinus Banksiana</i> .....	225	118	214	201	237
322	<i>Populus angustifolia</i> .....	260	284	292	299	274	384	<i>Pinus palustris</i> .....	110	7	18	26	167
323	<i>Populus trichocarpa</i> .....	285	57	204	209	293	385	<i>Pinus Cubensis</i> .....	70	5	15	21	137
324	<i>Populus monilifera</i> .....	281	98	145	240	258	386	<i>Picea nigra</i> .....	237	60	156	193	272
325	<i>Populus Fremontii</i> .....	214	73	183	225	252	387	<i>Picea alba</i> .....	273	90	185	256	283
325	<i>Populus Fremontii, var. Wislizeni</i> .....	238	160	186	230	239	388	<i>Picea Engelmanni</i> .....	295	185	240	292	275
CONIFERÆ.													
326	<i>Libocedrus decurrens</i> .....	274	157	199	130	242	391	<i>Picea pungens</i> .....	286	265	281	295	267
327	<i>Thuja occidentalis</i> .....	297	271	267	275	297	391	<i>Picea Sitichensis</i> .....	254	100	216	248	281
328	<i>Thuja gigantea</i> .....	284	81	154	145	284	392	<i>Tsuga Canadensis</i> .....	258	135	171	219	260
329	<i>Chamæcyparis sphaeroidea</i> .....	296	294	281	294	287	393	<i>Tsuga Caroliniana</i> .....	255	224	279	196	211
330	<i>Chamæcyparis Nutkaensis</i> .....	223	87	130	138	236	394	<i>Tsuga Mertensiana</i> .....	194	13	80	60	235
331	<i>Chamæcyparis Lawsoniana</i> .....	233	31	93	129	259	395	<i>Tsuga Pattoniana</i> .....	252	195	171	224	232
333	<i>Cupressus Govoniiana</i> .....	232	279	260	242	147	396	<i>Pseudotsuga Douglasii</i> .....	198	20	96	81	238
338	<i>Juniperus occidentalis, var. conjugens</i> .....	116	211	276	75	50	398	<i>Pseudotsuga Douglasii, var. macrocarpa</i> .....	249	74	111	132	233
339	<i>Juniperus Virginiana</i> .....	212	238	158	177	176	399	<i>Abies Fraseri</i> .....	290	104	219	255	280
340	<i>Taxodium distichum</i> .....	242	84	190	174	280	400	<i>Abies balsamea</i> .....	283	177	265	230	277
341	<i>Sequoia gigantea</i> .....	299	287	280	213	286	401	<i>Abies subalpina</i> .....	294	291	275	270	294
342	<i>Sequoia sempervirens</i> .....	261	236	238	187	271	402	<i>Abies grandis</i> .....	292	109	271	268	299
343	<i>Taxus brevifolia</i> .....	139	202	34	111	62	400	<i>Abies concolor</i> .....	289	130	180	210	269
345	<i>Torreya taxifolia</i> .....	198	170	94	134	166	400	<i>Abies amabilis</i> .....	260	24	134	127	292
246	<i>Torreya Californica</i> .....	227	204	243	250	203	405	<i>Abies nobilis</i> .....	241	21	105	141	205
PALMACEÆ.													
								<i>Washingtonia filifera</i> .....	199	263	285	297	164



TABLE OF AVERAGES—Continued.

Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength, in kilograms.	Ultimate resistance to longitudinal crushing, in kilograms.	Resistance to indentation to 1.27 millimeters, in kilograms.	Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength, in kilograms.	Ultimate resistance to longitudinal crushing, in kilograms.	Resistance to indentation to 1.27 millimeters, in kilograms.
<b>RHIZOPHORACEÆ.</b>							<b>BIGNONIACEÆ.</b>						
110	Rhizophora Mangle.....	114.06	1,650	515	13,707	7,394	206	Catalpa bignonioides.....	44.57	682	252	5,821	1,230
<b>COMBRETACEÆ.</b>							<b>VERBENACEÆ.</b>						
141	Conocarpus erecta.....	98.08	1,025	402	9,593	5,326	207	Catalpa speciosa.....	41.48	822	270	6,521	1,377
142	Laguncularia racemosa.....	70.21	724	221	7,190	2,886	208	Chilopsis saligna.....	58.79	544	247	4,753	2,304
<b>MYRTACEÆ.</b>							<b>NYCTAGINACEÆ.</b>						
144	Eugenia buxifolia.....	92.20	1,575	450	14,108	5,851	210	Citharexylum villosum.....	86.75	1,257	400	11,034	4,827
146	Eugenia monticola.....	89.83	1,085	500	8,245	6,532	212	Pisonia obtusata.....	60.31	465	127	4,962	1,737
148	Eugenia procera.....	92.05	1,191	502	10,750	7,099	<b>POLYGONACEÆ.</b>						
<b>CORNACEÆ.</b>							<b>LAURACEÆ.</b>						
151	Cornus florida.....	80.98	821	386	8,553	4,875	218	Coccoloba floridana.....	93.40	1,136	392	12,337	6,319
152	Cornus Nuttallii.....	74.44	1,031	423	10,603	3,883	215	Persea Carolinensis.....	63.81	839	385	9,173	3,123
153	Nyssa capitata.....	45.97	681	290	6,895	2,484	215	Persea Carolinensis, var. palustris.....	63.73	849	350	5,874	3,073
154	Nyssa sylvatica.....	63.06	818	360	7,497	3,131	217	Sassafras officinale.....	50.38	519	257	6,110	2,144
155	Nyssa uniflora.....	51.58	518	279	5,848	2,575	218	Umbellularia Californica.....	64.92	1,068	344	9,095	3,196
<b>CAPRIFOLIACEÆ.</b>							<b>EUPHORBIACEÆ.</b>						
159	Sambucus glauca.....	50.07	305	158	4,400	2,218	219	Drypetes crocea.....	86.44	1,039	340	10,410	5,767
159	Viburnum prunifolium.....	82.89	997	400	9,474	5,009	219	Drypetes crocea, var. latifolia.....	88.65	836	302	8,324	6,510
<b>RUBIACEÆ.</b>							<b>URTICACEÆ.</b>						
160	Exostemma Caribæum.....	92.89	1,194	429	12,020	7,707	222	Ulmus crassifolia.....	71.59	704	330	7,248	4,080
161	Pinckneya pubens.....	59.28	699	173	4,855	1,678	223	Ulmus fulva.....	69.77	953	371	8,628	2,399
<b>ERICACEÆ.</b>							<b>URTICACEÆ.</b>						
165	Andromeda ferruginea.....	74.06	814	290	7,802	3,611	224	Ulmus Americana.....	64.54	747	364	7,191	2,970
166	Arbutus Menziesii.....	70.24	888	387	8,034	3,322	225	Ulmus racemosa.....	72.20	1,006	455	9,474	3,281
167	Arbutus Xalapensis.....	70.81	616	204	6,419	3,947	226	Ulmus alata.....	74.17	523	309	7,001	4,095
169	Oxydendrum arboreum.....	74.30	889	311	8,025	3,650	227	Planera aquatica.....	52.71	552	265	6,305	2,334
170	Kalmia latifolia.....	71.31	585	273	6,890	4,196	228	Celtis occidentalis.....	72.08	685	337	6,739	3,472
171	Rhododendron maximum.....	62.80	646	283	7,020	3,066	228	Celtis occidentalis, var. reticulata.....	71.86	803	344	6,985	4,373
<b>SAPOTACEÆ.</b>							<b>JUGLANDACEÆ.</b>						
175	Chrysothryllum oliviforme.....	92.44	1,124	366	9,571	6,108	229	Ficus aurea.....	24.84	257	102	2,597	980
176	Sideroxylon Mastichodendron.....	95.89	1,099	414	10,410	5,682	231	Ficus pedunculata.....	45.07	407	98	4,491	1,905
177	Diphollis salicifolia.....	92.86	1,396	490	11,680	4,430	232	Morus rubra.....	58.56	824	331	6,721	2,805
178	Bumelia tonax.....	72.39	751	257	7,235	2,894	234	Maclura aurantiaca.....	76.01	944	483	12,939	5,806
179	Bumelia lanuginosa.....	64.04	483	165	5,799	2,564	<b>PLATANACEÆ.</b>						
181	Bumelia lycioides.....	74.07	781	240	7,825	3,529	235	Platanus occidentalis.....	56.52	864	271	7,207	2,645
182	Bumelia cuneata.....	78.08	603	220	7,643	4,581	236	Platanus racemosa.....	48.26	624	240	5,190	1,486
183	Mimusops Sieber.....	105.55	1,002	390	7,360	6,001	237	Platanus Wrightii.....	46.72	457	183	5,223	1,867
<b>EBENACEÆ.</b>							<b>JUGLANDACEÆ.</b>						
184	Diospyros Virginiana.....	78.32	732	375	8,045	5,192	238	Juglans cinerea.....	40.66	812	255	6,270	1,488
<b>STYRACEÆ.</b>							<b>JUGLANDACEÆ.</b>						
186	Symplocos tinctoria.....	52.88	622	264	6,149	2,967	239	Juglans nigra.....	60.91	1,092	365	9,178	3,140
187	Halesia diptera.....	56.81	683	366	6,940	3,153	240	Juglans rupestris.....	64.89	727	256	6,997	2,909
<b>OLEACEÆ.</b>							<b>JUGLANDACEÆ.</b>						
191	Fraxinus pistaciifolia.....	67.68	601	266	6,158	3,368	241	Carya oliviformis.....	70.99	660	247	6,951	3,714
192	Fraxinus Americana.....	65.16	1,015	367	7,535	2,745	242	Carya alba.....	63.11	1,399	512	10,007	4,344
192	Fraxinus Americana, var. Texensis.....	75.83	1,082	480	8,664	3,177	243	Carya sulcata.....	80.35	1,039	464	8,939	4,609
193	Fraxinus pubescens.....	62.35	812	371	6,969	3,272	244	Carya tomentosa.....	81.29	1,150	482	9,485	4,429
194	Fraxinus viridis.....	70.71	903	382	7,711	3,521	245	Carya porcina.....	81.36	1,014	460	9,232	4,822
195	Fraxinus platycarpa.....	35.16	476	229	4,014	2,209	246	Carya amara.....	74.74	1,030	470	8,357	3,878
196	Fraxinus quadrangulata.....	74.50	774	346	7,980	3,322	247	Carya myristiciformis.....	79.31	1,465	595	10,206	5,042
197	Fraxinus Organa.....	57.12	848	284	8,320	2,653	248	Carya aquatica.....	73.13	1,013	376	7,776	4,397
198	Fraxinus sambucifolia.....	62.72	872	345	6,766	3,106	<b>MYRICACEÆ.</b>						
199	Forestiera acuminata.....	68.00	703	306	6,418	2,717	249	Myrica cerifera.....	56.08	888	343	7,122	2,304
201	Osmanthus Americanus.....	80.74	1,231	440	8,980	4,206	250	Myrica Californica.....	66.31	992	442	8,516	3,017
<b>BORRAGINACEÆ.</b>							<b>CUPULIFERÆ.</b>						
204	Bourreria Havanensis.....	78.48	996	403	9,197	4,702	251	Quercus alba.....	74.39	971	386	8,183	3,288
205	Ehretia elliptica.....	68.56	397	308	6,192	3,663	252	Quercus lobata.....	73.87	717	369	6,793	3,014
							253	Quercus Garryana.....	74.24	811	375	7,957	3,840
							254	Quercus obtusiloba.....	83.01	833	372	7,790	4,415
							255	Quercus undulata, var. Gambelii.....	85.38	571	290	6,663	4,072
							256	Quercus macrocarpa.....	74.06	929	419	7,843	3,730
							257	Quercus lyrata.....	82.59	1,334	438	7,894	4,033
							258	Quercus bicolor.....	76.18	906	388	7,850	3,534

TABLE OF AVERAGES—Continued.

Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength, in kilograms.	Ultimate resistance to longitudinal crushing, in kilograms.	Resistance to indentation to 1.27 millimeters, in kilograms.	Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength, in kilograms.	Ultimate resistance to longitudinal crushing, in kilograms.	Resistance to indentation to 1.27 millimeters, in kilograms.	
259	Quercus Michauxii	80.03	904	477	7,715	3,725	324	Populus monilifera	38.53	904	328	5,051	1,027	
260	Quercus Prinus	74.42	1,255	440	8,015	3,686	325	Populus Fremontii	48.77	1,051	268	6,055	1,382	
261	Quercus prinoides	86.00	1,125	528	9,204	4,224	325	Populus Fremontii, var. Wislizeni	45.00	843	205	5,950	1,007	
262	Quercus Douglasii	88.53	771	424	8,018	5,088		CONIFERÆ.						
263	Quercus oblongifolia	97.00	857	307	6,941	7,081	326	Libocedrus decurrens	40.14	847	201	7,446	1,561	
264	Quercus grisea	99.10	740	400	7,066	5,829	327	Thuya occidentalis	31.53	533	210	4,903	957	
266	Quercus Durandii	91.00	837	424	8,550	4,922	328	Thuya gigantea	37.90	1,084	310	7,107	1,114	
267	Quercus virens	93.93	1,180	434	8,748	5,185	329	Chamaecyparis spherioidea	33.12	404	194	4,149	1,074	
268	Quercus chrysolepis	84.43	1,198	541	8,721	5,070	330	Chamaecyparis Nutkaensis	47.00	1,020	342	7,281	1,618	
269	Quercus Emoryi	90.44	698	300	6,759	6,046	331	Chamaecyparis Lawsoniana	46.10	1,217	370	7,454	1,317	
270	Quercus agrifolia	81.47	959	399	7,416	3,770	333	Cupressus Goveniana	46.68	490	230	5,742	2,852	
271	Quercus Wislizeni	77.75	561	349	8,527	4,362	338	Juniperus occidentalis, var. conjungens	68.75	794	200	8,505	4,464	
272	Quercus rubra	65.28	1,197	422	8,172	2,825	339	Juniperus Virginiana	40.11	070	310	6,750	2,376	
273	Quercus rubra, var. Texana	90.08	1,033	437	9,310	4,605	340	Taxodium distichum	45.24	1,032	201	6,771	1,166	
273	Quercus coccolna	73.91	1,065	450	8,074	3,224	341	Sequoia gigantea	28.67	451	196	6,210	1,091	
274	Quercus tinctoria	70.10	1,034	444	8,012	3,243	342	Sequoia sempervirens	42.02	676	255	6,650	1,242	
275	Quercus Kelloggii	64.13	745	328	7,184	2,783	343	Taxus brevifolia	63.78	761	400	7,784	4,223	
276	Quercus nigra	72.39	977	445	7,954	4,582	345	Torreya taxifolia	51.08	821	378	7,364	2,523	
277	Quercus falcata	69.11	1,402	509	9,532	3,223	346	Torreya Californica	40.06	401	240	5,025	1,902	
278	Quercus Catesbaei	72.31	1,085	447	7,316	3,046	347	Pinus Strobus	38.47	851	207	6,219	1,194	
279	Quercus palustris	68.82	1,123	465	7,862	3,040	348	Pinus monticola	38.99	950	200	5,349	1,071	
280	Quercus aquatica	72.07	1,227	449	8,023	3,169	349	Pinus Lambertiana	36.76	794	255	5,382	1,244	
281	Quercus laurifolia	76.10	1,259	504	8,424	4,056	350	Pinus flexilis	43.42	676	206	5,501	1,727	
282	Quercus heterophylla	68.22	1,225	458	6,600	2,908	351	Pinus albicaulis	41.54	512	240	5,290	1,710	
283	Quercus cinerea	63.47	751	424	7,167	3,221	352	Pinus reflexa	48.05	913	320	7,825	2,002	
284	Quercus hypoleuca	78.41	944	475	4,695	4,348	353	Pinus Parryana	56.44	378	182	5,420	3,126	
285	Quercus imbricaria	74.07	1,193	520	8,839	3,023	355	Pinus edulis	63.49	421	191	5,379	3,888	
286	Quercus Phellos	74.35	784	422	6,236	3,452	356	Pinus monophylla	56.20	435	123	4,989	2,718	
287	Quercus densiflora	67.25	964	404	7,609	3,593	357	Pinus Balfouriana	54.17	594	181	5,998	2,950	
288	Castanopsis chrysophylla	55.55	1,012	316	6,959	1,912	357	Pinus resinosa, var. aristata	55.55	715	279	5,200	2,140	
289	Castanea pumila	58.80	1,141	423	7,923	1,887	358	Pinus Torreyana	50.62	542	323	4,518	2,300	
290	Castanea vulgaris, var. Americana	44.05	856	297	6,106	1,608	359	Pinus Arizona	50.28	824	270	6,202	1,740	
291	Fagus ferruginea	68.48	1,210	490	7,550	3,145	361	Pinus ponderosa	46.00	887	307	6,037	1,719	
292	Ostrya Virginica	82.42	1,373	484	8,600	3,696	362	Pinus Jeffreyi	50.53	925	318	6,679	1,880	
293	Carpinus Caroliniana	72.20	1,140	400	7,969	3,405	363	Pinus Chiluhuana	54.37	726	355	5,908	2,470	
	BETULACEÆ.							364	Pinus contorta	58.04	1,585	423	8,368	2,382
294	Betula alba, var. populifolia	57.43	730	332	5,564	2,073	365	Pinus Murrayana	40.38	771	241	5,928	1,379	
295	Betula papyrifera	50.40	1,306	454	7,781	2,038	366	Pinus Sabiniana	48.18	585	393	5,387	2,202	
296	Betula occidentalis	60.12	924	344	6,280	2,459	367	Pinus Coulteri	41.18	1,141	325	5,374	1,476	
297	Betula lutea	65.34	1,018	533	9,907	2,581	368	Pinus insignis	46.60	979	316	6,080	1,087	
298	Betula nigra	57.42	1,113	415	7,007	2,117	369	Pinus tuberculata	34.88	429	175	4,267	1,372	
299	Betula lenta	75.97	1,432	519	9,907	3,015	370	Pinus Teda	54.27	1,128	377	6,394	1,719	
301	Alnus rubra	47.93	1,060	346	6,644	1,870	371	Pinus rigida	51.39	581	310	5,087	2,123	
302	Alnus rhombifolia	41.14	840	291	5,696	1,257	372	Pinus serotina	70.20	1,170	497	8,079	4,740	
303	Alnus oblongifolia	39.05	769	293	4,452	1,189	373	Pinus inops	52.93	543	281	5,705	2,400	
	SALICACEÆ.							374	Pinus clausa	55.00	543	214	6,038	2,100
307	Salix amygdaloides	44.68	501	235	4,224	1,294	375	Pinus pungens	49.22	808	310	5,070	1,842	
308	Salix levigata	48.44	438	275	5,114	1,894	376	Pinus muricata	40.20	1,194	441	8,142	1,950	
309	Salix lasiandra, var. lancifolia	45.73	305	200	4,581	1,311	377	Pinus mitis	60.80	1,375	443	7,628	2,064	
309	Salix lasiandra, var. Fendleriana	45.12	879	288	5,467	1,400	378	Pinus glabra	39.13	448	212	4,604	1,694	
313	Salix flavescens	53.01	1,292	388	7,484	2,019	379	Pinus Banksiana	47.50	942	278	6,329	1,609	
313	Salix flavescens, var. Scouleriana	40.39	1,085	345	6,532	1,581	380	Pinus palustris	69.82	1,488	400	10,074	2,598	
316	Salix lasiolepis	55.32	888	347	6,169	2,241	381	Pinus Cubensis	74.83	1,577	500	10,626	2,985	
318	Populus tremuloides	40.10	814	289	5,285	1,281	382	Picea nigra	45.71	1,100	318	6,520	1,240	
319	Populus grandidentata	40.11	963	308	5,727	994	383	Picea alba	40.38	1,023	319	5,489	1,117	
320	Populus heterophylla	40.57	723	274	4,527	1,384	384	Picea Engelmanni	33.88	808	245	4,271	1,217	
321	Populus balsamifera	36.11	857	235	5,126	1,202	385	Picea pungens	37.26	553	194	4,123	1,267	
321	Populus balsamifera, var. candidana	41.42	730	260	4,418	1,030	386	Picea Sitchensis	42.80	990	277	5,053	1,160	
322	Populus angustifolia	38.81	458	171	4,332	1,225	387	Tsuga Canadensis	42.20	900	397	6,142	1,314	
323	Populus trichocarpa	37.66	1,117	284	6,243	1,018	388	Tsuga Caroliniana	42.58	713	197	6,450	1,900	
							389	Tsuga Mertensiana	51.61	1,375	388	8,747	1,622	

TABLE OF AVERAGES—Continued.

Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength in kilograms.	Ultimate resistance to longitudinal crushing, in g. in kilograms.	Resistance to indentation to 1.27 millimeters in kilograms.	Catalogue number.	Species.	Approximate relative fuel value.	Coefficient of elasticity, kilograms on millimeters.	Ultimate transverse strength in kilograms.	Ultimate resistance to longitudinal crushing, in g. in kilograms.	Resistance to indentation to 1.27 millimeters in kilograms.
390	<i>Tsuga Pattoniana</i> .....	44.35	775	307	6,074	1,064	398	<i>Abies amabilis</i> .....	42.18	1260	338	7,480	1,029
391	<i>Pseudotsuga Douglasii</i> .....	51.53	1283	376	8,289	1,608	399	<i>Abies nobilis</i> .....	45.46	1277	368	7,256	1,817
391	<i>Pseudotsuga Douglasii, var. macrocarpa</i> .....	45.59	1050	361	7,405	1,642	400	<i>Abies magnifica</i> .....	46.87	662	299	6,963	1,545
392	<i>Abies Fraseri</i> .....	35.46	972	273	5,557	1,048	401	<i>Larix Americana</i> .....	62.16	1261	384	8,763	1,675
393	<i>Abies balsamea</i> .....	38.02	810	220	5,851	1,202	402	<i>Larix occidentalis</i> .....	74.00	1658	524	11,023	2,395
394	<i>Abies subalpina</i> .....	34.61	762	202	4,829	1,015							
395	<i>Abies grandis</i> .....	35.08	958	211	6,255	810							
396	<i>Abies concolor</i> .....	36.07	909	300	6,237	1,248	405	<i>Washingtonia filifera</i> .....	50.75	563	183	3,693	2,550

The following table illustrates the relation between the specific gravity and the transverse strength of the wood of species upon which a sufficient number of tests has been made to render such a comparison valuable. The determinations of the specific gravity and transverse strength were, in every case, made upon the same specimen, at the same time. The table is arranged according to the specific gravity of the specimens.

It will be noticed that the strength of the different specimens closely but not invariably follows their specific gravity. An examination of Table III will show, however, that in nearly every case where any wide difference occurs it is due to imperfections in the stick disproportionately affecting its strength. Moreover, in the case of species where the specific gravity and strength of different specimens are nearly identical, their order of arrangement becomes largely accidental. A slight difference in the time occupied in the strength tests, or slight variations in the direction of the grain of the wood, may considerably affect the sequence in such a table:

TABLE ILLUSTRATING THE RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY IN THE WOOD OF CERTAIN SPECIES.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.
8	<i>Magnolia acuminata</i> .....	534	1	1	66	<i>Acer rubrum</i> .....	20	1	8
		534	2	2			878	2	3
		246	3	3			878	3	1
		261	4	5			1048	4	2
		246	5	4			1048	5	4
		261	6	6			530	6	5
8	<i>Liriodendron Tulipifera</i> .....	818	1	1	77	<i>Robinia Pseudacacia</i> .....	530	7	6
		818	2	5			743	8	9
		1231	3	2			743	9	7
		1236	4	6			1248	1	1
		1236	5	4			40	2	2
		1232	6	3			1248	3	5
60	<i>Acer macrophyllum</i> .....	1232	7	8	108	<i>Prunus serotina</i> .....	1247	4	3
		895	8	7			1247	5	4
		982	1	1			815	6	6
		982	2	2			815	7	7
		1023	3	4			15	1	1
		1023	4	3			15	2	2
64	<i>Acer saccharinum</i> .....	299	1	2	117	<i>Pyrus coronaria</i> .....	127	3	4
		1233	2	1			1053	4	5
		1235	3	7			1053	5	6
		1234	4	6			127	6	3
		1235	5	5			768	7	8
		1234	6	4			763	8	7
		1233	7	3			868	9	9
		376	8	8			817	10	10
		409	9	9			817	11	11
		274	1	1			115	12	13
64	<i>Acer saccharinum, var. nigrum</i> .....	213	2	2	406	13	12		
		767	3	3	1085	1	1		
		757	4	4	7108	2	3		

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RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY, ETC.—Continued.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.
117	<i>Pyrus coronaria</i> —continued .....	1088	3	2	194	<i>Fraxinus viridis</i> —continued .....	948	2	4
		1087	4	4			967	3	1
189	<i>Liquidambar styraciflua</i> .....	1173	1	2			488	4	3
		1182	2	9			67	5	7
		1182	3	5			057	6	5
		1183	4	8			308	7	6
		1173	5	1			308	8	8
		1095	6	3	196	<i>Fraxinus quadrangulata</i> .....	66	1	3
		1181	7	11			60	2	2
		1181	8	10			280 <sup>1</sup>	3	1
		546	9	6			518	4	5
		1095	10	4			280 <sup>2</sup>	5	6
		540	11	12			201	6	4
		1183	12	7			125	7	8
151	<i>Cornus florida</i> .....	1077	3	1	217	<i>Sassafras officinale</i> .....	125	8	7
		1077	4	3			814	1	6
		1092	5	8			814	2	4
		812	6	4			71	3	1
		812	7	5			864	4	7
		761	8	7			854	5	8
		67	9	6			446	6	5
		67	10	4			387	7	3
154	<i>Nyssa sylvatica</i> .....	750	1	2			71	8	2
		885	2	9	223	<i>Ulmus fulva</i> .....	387	9	0
		750	3	1			71	8	2
		883	4	6			387	9	0
		833	5	4	224	<i>Ulmus Americana</i> .....	131	1	1
		834	6	7			134	2	2
		834	7	3			593	1	0
		813	8	5			593	2	4
		813	9	8			1049	3	2
155	<i>Nyssa uniflora</i> .....	128	1	2			19	4	1
		128	2	1			19	5	3
		604	3	6			1036	6	11
		604	4	4			1036	7	10
		559	5	5			958	8	7
		550	6	3			281	9	8
		550	6	3			281	10	9
184	<i>Diospyros Virginiana</i> .....	425	1	1	225	<i>Ulmus racemosa</i> .....	958	11	5
		1084	2	6			110	1	1
		1162	3	4			314	2	2
		811	4	3			314	3	5
		1084	5	2			110 <sup>5</sup>	4	3
		811	6	5			428	5	7
		61	7	8			110 <sup>3</sup>	6	4
		61	8	7			110	7	6
192	<i>Fraxinus Americana</i> .....	1045	1	1	228	<i>Celtis occidentalis</i> .....	873	1	5
		1045	2	4			873	2	4
		114 <sup>3</sup>	3	3			1111	3	1
		937	4	19			306	4	6
		227 <sup>2</sup>	5	2			306	5	7
		130	6	7			1111	6	2
		431	7	6			75	7	3
		114 <sup>4</sup>	8	5			75	8	8
		227 <sup>1</sup>	9	10	232	<i>Morus rubra</i> .....	132	1	1
		30 <sup>2</sup>	10	8			1255	2	4
		212	11	11			132	3	2
		212	12	9			1255	4	6
		747	13	21			1244	5	3
		551	14	14			1245	6	5
		227	15	13			1246	7	7
		747	17	17	238	<i>Juglans cinerea</i> .....	1057	1	1
		551	18	15			76 <sup>2</sup>	2	2
		114 <sup>5</sup>	19	16			16	3	7
		114	20	18			10	4	4
		114	21	20			76	5	5
194	<i>Fraxinus viridis</i> .....	940	1	2			76	6	3
							123	7	6
							393	8	8

RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY, ETC.—Continued.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.
230	<i>Juglans nigra</i> .....	951	1	4	251	<i>Quercus alba</i> —continued .....	49 <sup>1</sup>	19	15
		951	2	3			250 <sup>2</sup>	20	21
		766	3	1			49 <sup>3</sup>	21	17
		766	4	0			49 <sup>2</sup>	22	24
		318	5	9			8	23	25
		325	6	8			403	24	28
		407	7	5			395	25	29
		117	8	2			251	26	4
		117	9	7			113 <sup>2</sup>	27	31
							403	28	33
		242	<i>Carya alba</i> .....	29 <sup>2</sup>			1	4	253
539	2			7	32 <sup>2</sup>	30	20		
531	3			2	113 <sup>3</sup>	31	34		
531	4			3	49	32	22		
1056	5			12	443	33	35		
1056	6			13	32 <sup>3</sup>	34	22		
3	7			6	113	35	31		
1097	8			1	985	1	1		
249	9			11	1027	2	6		
118	10			14	985	3	3		
249	11			10	988	4	2		
243	<i>Carya sulcata</i> .....	118	12	16	254	<i>Quercus obtusiloba</i> .....	1027	5	7
		3	13	5			1029	6	4
		816	14	9			988	7	5
		539	15	8			1029	8	8
		816	16	15			771	1	5
		533	1	3			771	2	7
		1082	2	5			256	3	3
		391	3	1			151	4	1
		1166	4	6			151	5	2
		391	5	4			351	6	4
		1082	6	7			351	7	4
245	<i>Carya porolna</i> .....	1164	7	2	255	<i>Quercus macrocarpa</i> .....	187	1	1
		1170	8	8			310	2	2
		1165	9	9			1071	3	5
		88	1	1			310	4	10
		88	2	2			143	5	13
		1103	3	7			933	6	12
		1168	4	4			1073	7	6
		442	5	9			1072	8	7
		538	6	3			933	9	11
		6	7	5			79	10	3
		6	8	6			432	11	9
248	<i>Carya aquatica</i> .....	121	9	8	257	<i>Quercus lyrata</i> .....	831	12	4
		740	1	1			79	13	2
		740	2	5			545	1	1
		362	3	3			762	2	2
		362	4	4			762	3	3
		129	5	2			545	4	4
		917	6	6			54	1	1
		1257	1	18			846	2	5
		749	2	27			846	3	4
		547	3	1			54 <sup>2</sup>	4	2
		251	<i>Quercus alba</i> .....	547			4	11	258
1257	5			14	846	2	5		
8	6			10	54	3	3		
1050	7			10	755	1	8		
749	8			8	755	2	1		
259	9			9	240	3	5		
233	10			5	240	4	6		
748	11			3	524	5	4		
82	12			12	524	6	2		
1050	13			2	85	1	1		
49	14			13	925	2	3		
255	<i>Quercus prinus</i> .....	250	15	7	260	<i>Quercus Michauxii</i> .....	31	3	5
		895	16	29			925	4	4
		233	17	6			31	5	2
		250	18	16			434	6	6
		250	15	7			273	1	2
		895	16	29			287	2	4
		233	17	6					
		250	18	16					

## RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY, ETC.—Continued.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.
281	<i>Quercus prinoides</i> —continued.....	514	3	3	291	<i>Fagus ferruginea</i> —continued.....	765	7	9
		34 <sup>2</sup>	4	1			765	8	7
		514	5	6			443	0	10
		34	6	5			44 <sup>2</sup>	10	8
267	<i>Quercus virens</i> .....	404	1	3	295	<i>Betula papyrifera</i> .....	830	1	1
		954	2	7			1065	2	2
		954	3	6			1065	3	4
		799	4	2			1007	4	3
		919	5	4			722	5	5
		799	6	1			990	6	9
		919	7	5			1066	7	6
272	<i>Quercus rubra</i> .....	1043	1	1			1006	8	7
		146	2	10			990	9	11
		1043	3	4			1007	10	10
		217	4	6			722	11	8
		215	5	7	297	<i>Betula lutea</i> .....	843	1	2
		218	6	3			843	2	8
		7	7	2			1008	4	7
		7	8	5			1009	5	6
		149	9	8			1070	3	4
		215	10	11			1008	6	5
		92	11	13			1069	7	1
		45 <sup>2</sup>	12	9			1070	8	3
		141	13	15	298	<i>Betula nigra</i> .....	842	1	5
		920	14	6			841	2	4
		920	15	7			841	3	2
		45 <sup>1</sup>	16	12			842	4	6
		45 <sup>2</sup>	17	14			136	5	1
274	<i>Quercus tinctoria</i> .....	74	1	4			136	6	3
		36 <sup>2</sup>	2	9	301	<i>Alnus rubra</i> .....	901	1	4
		36 <sup>2</sup>	3	2			901	2	3
		86	4	6			1025	3	1
		86	5	3			907	4	5
		247	6	1			907	5	6
		17	7	5			1025	6	2
		247	8	3	324	<i>Populus monilifera</i> .....	809	1	3
		497	9	10			754	2	2
		17	10	7			754	3	1
		244	11	11			309	1	3
		444	12	12			304	5	5
277	<i>Quercus falcata</i> .....	548	1	20			304	6	6
		265	2	1	325	<i>Populus Fremontii</i> , var. <i>Wislizeni</i> .....	912	1	5
		548	3	2			646	2	2
		131	4	5			646	3	4
		131	5	7			909	4	1
		265	6	4			912	5	6
		245	7	6			909	6	3
		245	8	8	327	<i>Thuja occidentalis</i> .....	1099	1	2
280	<i>Quercus aquatica</i> .....	742	1	1			874	2	1
		511	2	3			874	3	5
		742	3	9			782	4	7
		511	4	2			1099	5	3
		349	5	4			788	6	8
		349	6	3			788	7	10
		264 <sup>1</sup>	7	6			790	8	4
		264 <sup>2</sup>	8	5			790	9	6
		264 <sup>3</sup>	9	7			379	10	9
280	<i>Castanea vulgaris</i> , var. <i>Americana</i> .....	18	1	2			379	11	11
		258	2	1			792	12	12
		516	3	3			798	13	13
		18	4	4	329	<i>Chamaecyparis sphaeroides</i> .....	350	1	7
291	<i>Fagus ferruginea</i> .....	119	1	2			850	2	3
		9	2	1			850	3	1
		853	3	4			851	4	4
		9	4	3			851	5	2
		853	5	6			852	6	5
		119	6	5			850	7	6

RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY, ETC.—Continued.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.
330	<i>Chamaecyparis Nutkaensis</i> .....	969	1	5	378	<i>Pinus glabra</i> —continued.....	764	2	2
		983	2	1			142	3	4
		1000	3	8			142	4	2
		983	4	8			544	5	6
		1000	5	6			514	6	5
		994	6	4			780	1	1
		994	7	2			879	2	2
		969	8	7			394	3	3
		1240	1	5			394	4	4
		1250	2	7			879	5	6
330	<i>Juniperus Virginiana</i> .....	784	3	1	380	<i>Pinus palustris</i> .....	780	6	5
		800	4	4			81	1	1
		800	5	3			358	2	7
		327	6	2			559	3	2
		327	7	6			358	4	3
		711	1	5			357	5	1
342	<i>Sequoia sempervirens</i> .....	710	2	1	381	<i>Pinus Cubensis</i> .....	81	6	10
		711	3	3			493	1	0
		713	4	6			493	2	4
		713	5	2			356	3	2
		712	6	4			556	4	1
		712	7	7			84	5	3
		222	1	2			84	6	5
		1044	2	7			231	1	1
		797	3	1			231	2	2
		1	4	4			776	3	3
347	<i>Pinus Strobus</i> .....	788	5	3	382	<i>Picea nigra</i> .....	380	4	4
		788	6	5			776	5	0
		797	7	0			373	6	7
		1044	8	11			880	7	8
		789	9	8			794	8	5
		789	10	9			794	9	6
		777	11	10			513	1	6
		315	1	1			773	2	3
		315	2	2			773	3	1
		1070	3	3			784	4	5
358	<i>Pinus resinosa</i> .....	1076	4	5	383	<i>Picea alba</i> .....	513	5	4
		785	5	4			773	6	8
		1074	6	0			784	7	2
		1075	7	7			513	8	4
		785	8	8			784	9	0
		632	1	3			784	0	2
		910	2	10			591	7	2
		907	3	11			970	1	3
		689	4	1			970	2	2
		619	5	4			1015	3	1
361	<i>Pinus ponderosa</i> .....	630	6	9	386	<i>Picea Sitohensis</i> .....	977	4	4
		731	7	6			1026	5	8
		626	8	2			977	6	5
		718	9	5			1026	7	9
		630	10	12			1010	8	6
		718	11	8			1019	9	7
		636	12	7			793	1	6
		82	1	1			793	2	2
		355	2	4			772	3	1
		355	3	6			772	4	3
370	<i>Pinus Taeda</i> .....	388	4	2	387	<i>Tsuga Canadensis</i> .....	793	1	6
		389	5	3			793	2	2
		388	6	7			772	3	1
		389	7	5			772	4	3
		1172	1	4					
		1172	2	2					
373	<i>Pinus inops</i> .....	1169	3	6					
		1169	4	1					
		622	5	5					
		621	6	3					
373	<i>Pinus glabra</i> .....	769	1	1					

## RELATION BETWEEN TRANSVERSE STRENGTH AND SPECIFIC GRAVITY, ETC.—Continued.

Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.	Catalogue number.	Species.	Office number.	Relative specific gravity.	Relative transverse strength.						
387	<i>Tsuga Canadensis</i> —continued .....	1040	5	4	301	<i>Pseudotsuga Douglasii</i> —continued .....	1022	26	26						
		1040	6	5			1008	50	22						
		775	7	13			271 <sup>2</sup>	27	24						
		787	8	9			1020	26	21						
		787	9	8			1022	29	6						
		5	10	10			980	30	23						
		219	11	7			1020	31	4						
		775	12	15			702	32	34						
		1042	13	11			709	53	22						
		1042	14	12			700	84	27						
		5	15	17			394	<i>Abies subalpina</i> .....	449	1	2				
		817	16	14					440 <sup>2</sup>	2	6				
		219	17	16					440 <sup>1</sup>	8	5				
		817	18	18					440 <sup>1</sup>	4	1				
		778	19	20					820	5	3				
		778	20	19					820	6	4				
		381	<i>Pseudotsuga Douglasii</i> .....	708					1	1	396	<i>Abies concolor</i> .....	783	1	1
				708					2	2			689	2	3
				704					3	8			783	3	2
				1018					4	8			689	4	4
1018	5			10	520	5	6								
1018	6			33	529	6	5								
980	7			7	401	<i>Larix Americana</i> .....	220 <sup>2</sup>	1	1						
1018	8			18			220	2	3						
705	9			14			774	3	10						
627	10			5			840	4	8						
881	11			9			786	5	2						
881	12			18			795	6	4						
1003	13			19			774	7	5						
706	14			11			795	8	7						
720	15			15			840	9	0						
1011	16			17			781	10	12						
627	17			12	786	11	6								
720	18			30	781	12	11								
1011	19			32	402	<i>Larix occidentalis</i> .....	1006	1	3						
974	20			16			1006	2	4						
782	21	21	984	3			1								
782	22	29	984	4			2								
973	23	25	719	5			5								
978	24	20	710	6			6								

## GENERAL REMARKS.

An examination of the results obtained from the various tests made upon the woods of North America indicate at least the important fact that within the limits of any species the weight and strength of any specimen of wood depends upon the actual proportion of the space occupied in the layers of annual growth with open ducts to the space occupied with compact, woody tissue, and to the size of these ducts; or in the case of the wood of Coniferae, the proportion of space occupied with cells formed early in the season to that occupied with the smaller cells of the summer growth. The proportion between these two kinds of growth varies not only in every individual tree, but in different parts of the same tree. The causes which thus affect the growth of wood are not very apparent. It is not soil, nor age, nor general climatic conditions, it appears, which produce the different proportion between the solid and the light portions of the annual growth in any species, because in the same individual this proportion is found to vary from year to year. It varies very irregularly; nor does the rapidity of growth, as has been supposed, greatly affect the strength of wood, because the proportion of open to compact growth is little affected by rapid or slow increase of the tree's diameter. How far annual climatic variations affect the nature of the annual layers of growth has not been demonstrated, although it is not impossible that in years in which conditions favorable to rapid growth are extended late into the season, the proportion of the annual layer occupied by open, weak growth to the growth of the whole year would be greater than that formed in a year during which the season favorable for rapid growth was less extended.

It follows that while such experiments as those conducted by Mr. Sharples are necessary to establish maximum and relative values for any species, these being established, actual values of any given specimen of

wood may be determined by microscopic examination of its structure; that is, two specimens of the wood of any species to which the census tests have been applied being given, their relative values can be determined by an examination of their structure as well as or better than by any elaborate experiments.

TANNIN VALUES.

The amount of tannin contained in the bark of various trees of the United States has been determined.

These determinations give the proportion of tannin. They do not indicate the real value of the bark of the species for tanning, which can only be obtained by actual experiments made on a large scale, other properties in the bark, beside the percentage of tannin, affecting the value of the leather prepared with it.

These determinations must therefore be regarded as approximations, which will serve, in some cases, to indicate species not now in general use for this purpose, which may be looked to as possible sources of tannin supply.

The methods adopted by Mr. Sharples in making these determinations are described by him as follows:

The tannin in each case was determined in the rossed bark; that is, bark deprived of the main part of the outside coating. The method employed was that devised by Lowenthal, which may be thus briefly described: A standard decoction of the bark is titrated with permanganate of potash, a quantity of indigo being first added to it. In a second portion the tannin is precipitated by means of gelatine, and the gallic acid in the liquid again determined by permanganate and indigo. The difference between these two readings gives the amount of tannin in the bark, the value of the permanganate having previously been determined by pure tannic acid, or by oxalic acid and calculation.

The bark of the following species has been examined:

Catalogue number.	Botanical name.	Common name.	Tannin values		Catalogue number.	Botanical name.	Common name.	Tannin values	
			Per cent. of tannin.	Per cent. of ash.				Per cent. of tannin.	Per cent. of ash.
14	<i>Gordenia Lasianthus</i> .....	Loblolly Bay. Tan Bay .....	13.14	2.35	275	<i>Quercus Kelloggii</i> .....	Black Oak .....	6.76	8.64
93	<i>Prosopis juliflora</i> .....	Mosquit. Algaroba. Honey Locust. Honey Pod.	4.04	8.71	276	<i>Quercus nigra</i> .....	Black Jack. Jack Oak .....	4.36	6.23
140	<i>Rhizophora Mangle</i> .....	Mangrove .....	31.04	0.70	277	<i>Quercus falcata</i> .....	Spanish Oak. Red Oak .....	8.59	4.32
160	<i>Exostemma Caribæum</i> .....	.....	5.81	7.10	287	<i>Quercus densiflora</i> .....	Tanbark Oak. Chestnut Oak. Peach Oak.	16.46	3.84
251	<i>Quercus alba</i> .....	White Oak .....	5.99	0.11	290	<i>Castanea vulgaris, var. Ameri- cana.</i>	Chestnut .....	6.25	2.00
256	<i>Quercus macrocarpa</i> .....	Burr Oak. Mossy-cup Oak. Over-cup Oak.	4.59	8.05	382	<i>Picea nigra</i> .....	Black Spruce .....	7.20	2.34
200	<i>Quercus Prinus</i> .....	Chestnut Oak. Rock Chest- nut Oak.	6.25	3.33	384	<i>Picea Engelmanni</i> .....	White Spruce .....	20.56	2.75
261	<i>Quercus prinoides (old tree)</i> ..	Yellow Oak. Chestnut Oak. Chinquapin Oak.	4.33	8.38	384	<i>Picea Engelmanni</i> .....	do .....	17.01	2.32
261	<i>Quercus prinoides (young tree)</i> ..	do .....	10.33	6.23	384	<i>Picea Engelmanni</i> .....	do .....	12.60	0.75
267	<i>Quercus virens</i> .....	Live Oak .....	10.46	8.89	387	<i>Tsuga Canadensis</i> .....	Hemlock .....	13.11	1.31
269	<i>Quercus Emoryi</i> .....	Black Oak .....	0.76	15.09	389	<i>Tsuga Mertensiana</i> .....	do .....	14.42	1.44
272	<i>Quercus rubra</i> .....	Red Oak. Black Oak .....	4.56	4.43	389	<i>Tsuga Mertensiana</i> .....	do .....	15.37	1.49
274	<i>Quercus tinctoria</i> .....	Black Oak. Yellow-bark Oak. Quercitron Oak. Yellow Oak.	5.90	5.73	390	<i>Tsuga Pattoniana</i> .....	.....	15.72	2.48
					391	<i>Pseudotsuga Douglasii</i> .....	Red Fir. Yellow Fir. Ore- gon Pine. Douglas Fir.	13.79	1.56

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
<b>MAGNOLIACEÆ.</b>								
1. <i>Magnolia grandiflora</i> <i>Big Laurel. Bull Bay.</i>	346	Alabama	Cottage Hill	C. Mohr	Rich loam	0.372	116	
2. <i>Magnolia glauca</i> <i>Sweet Bay. White Bay. Beaver Tree. White Laurel. Swamp Laurel.</i>	354	do	do	do	Swampy	0.268	91	20
3. <i>Magnolia acuminata</i> <i>Cucumber Tree. Mountain Magnolia.</i>	246	Virginia	Wytheville	H. Shriver	Clay limestone			
	261 <sup>1</sup>	do	Fancy Gap	do	Rich, light			
	261 <sup>2</sup>	do	do	do	do			
	261 <sup>3</sup>	do	do	do	do			
	584	Mississippi	Selvers' mill	C. Mohr	do	0.198	20	14
4. <i>Magnolia cordata</i> <i>Cucumber Tree.</i>	1178	Alabama	Winston county	C. Mohr				
5. <i>Magnolia macrophylla</i> <i>Large-leaved Cucumber Tree.</i>	22	North Carolina	Statesville	M. E. Hyams	Rich	0.050	18	
	582	Mississippi	Quitman	C. Mohr	Rich, low			
6. <i>Magnolia Umbrella</i> <i>Umbrella Tree. Elk Wood.</i>	266 <sup>1</sup>	Virginia	Wytheville	H. Shriver		0.072	15	8
	266 <sup>2</sup>	do	do	do				
	266 <sup>3</sup>	do	do	do				
7. <i>Magnolia Fraseri</i> <i>Long-leaved Cucumber Tree.</i>	260 <sup>1</sup>	do	Fancy Gap	do	Damp	0.085	20	
	260 <sup>2</sup>	do	do	do	do			
	260 <sup>3</sup>	do	do	do	do			
8. <i>Liriodendron Tulipifera</i> <i>Tulip Tree. Yellow Poplar. White Wood.</i>	198	Michigan	Dansville	W. J. Beal	Sandy			
	165	Ohio	D. E. McSherry & Co.	E. E. Barney				
	174	Tennessee	Woodsum Machine Company.	do				
	177	Ohio	Barney & Smith Manufacturing Co.	do				
	178	do	D. E. McSherry & Co.	do				
	187	do	J. W. Stoddard & Co.	do				
	188	do	Barney & Smith Manufacturing Co.	do				
	305	Michigan	Lansing	W. J. Beal				
	818	West Virginia	Grafton	C. G. Pringle				
	1231	Pennsylvania	Chester county	P. P. Sharples				
	1232	do	do	do				
<b>ANONACEÆ.</b>								
9. <i>Asimina triloba</i> <i>Papaw. Custard Apple.</i>	211	Missouri	Meramec river, Jefferson county.	G. W. Letterman	Alluvial	0.109		
	382	Tennessee	Cumberland river	A. Gattinger	do	0.086		
10. <i>Anona laurifolia</i> <i>Pond Apple.</i>	479	Florida	Bay Biscayne	A. H. Curtiss	Swampy	0.240	47	

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.6040	0.6080		0.6360	0.40	0.65	0.53	39.63	Second sp. gr. determination made on sap-wood	346
0.5034	0.5037		0.5035	0.42	0.53	0.47	31.38		354
0.5012	0.5413		0.5213	0.29	0.26	0.27			246
0.4309			0.4309	0.25		0.25			261 <sup>1</sup>
0.4562			0.4562	0.30		0.30			261 <sup>1</sup>
0.4215			0.4215	0.30		0.30			261 <sup>1</sup>
0.5065	0.5058		0.5061	0.34	0.33	0.34			534
			0.4690			0.29	29.23		
0.4095	0.4134	0.4101	0.4130	0.25	0.39	0.32	25.79	Third sp. gr. determination made on sap-wood; fourth sp. gr. determination, 0.4175.	1178
0.5375	0.4859		0.5117	0.32		0.32		All sap-wood	22
0.5468	0.5534		0.5501	0.45	0.34	0.39			532
			0.5309			0.35	33.09		
0.3787			0.3787	0.19		0.19		Growth rapid	266 <sup>1</sup>
0.5067			0.5067	0.18		0.18		Growth rapid; 0.5 sap-wood	266 <sup>2</sup>
0.4606			0.4606	0.24		0.24		Growth rapid; all sap-wood	266 <sup>3</sup>
			0.4487			0.20	27.96		
0.5430			0.5430	0.25		0.25		All sap-wood	260 <sup>1</sup>
0.4976			0.4976	0.27		0.27			260 <sup>2</sup>
0.4002			0.4602	0.33		0.33		All sap-wood	260 <sup>3</sup>
			0.5003			0.28	31.18		
0.3843			0.3843	0.25		0.25			138
0.3831	0.3783		0.3807	0.27	0.27	0.27		Yellow poplar	165
0.3798	0.3787		0.3792	0.20	0.22	0.21		Yellow poplar (soft)	174
0.4475	0.4361		0.4418	0.17	0.15	0.16		Hard poplar	177
0.4512	0.4442		0.4477	0.19	0.19	0.19		Hard poplar	178
0.4302	0.4150		0.4256	0.13	0.21	0.19		Yellow poplar	187
0.4430	0.4551		0.4493	0.25	0.30	0.27			188
0.3774			0.3774	0.33	0.31	0.32			395
0.4768	0.4822		0.4793	0.26	0.29	0.28			318
0.4444	0.4400		0.4427	0.20	0.22	0.21		White poplar	1231
0.4199	0.4712		0.4455	0.19	0.16	0.18		Yellow poplar	1232
			0.4230			0.23	26.36		
0.3540	0.3810		0.3679	0.16	0.14	0.15			211
0.4259			0.4259	0.24	0.30	0.27			332
			0.3969			0.21	24.74		
0.4912	0.5199	0.5048	0.5053	4.94	4.79	4.86	31.49		479

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
<b>CAPPARIDACEÆ.</b>								
11. <i>Capparis Jamaicensis</i> .....	477	Florida.....	Upper Metacombe Key.	A. H. Curtiss.....	Coral.....	0.098	34	.....
	1186	do.....	do.....	do.....	do.....			
<b>CANELLACEÆ.</b>								
12. <i>Canella alba</i> .....	499	do.....	Umbrella Key.....	do.....	do.....	0.620	17	.....
<i>White Wood. Cinnamon Bark. Wild Cinnamon.</i>	1181	do.....	Elliott's Key.....	do.....	do.....	0.120	5	14
<b>TERNSTREMIACEÆ.</b>								
14. <i>Gordonia Lasianthus</i> .....	286	South Carolina.....	Bonneau's Depot.....	H. W. Ravenel.....	Wet pine-barren.....			
<i>Loblolly Bay. Tan Bay.</i>	414	do.....	Aiken.....	do.....	Swampy.....	0.830	22	25
<b>STERCULIACEÆ.</b>								
16. <i>Fremontia Californica</i> .....	1280	California.....	San Bernardino mountains.	C. G. Pringle.....				
<i>Slippery Elm.</i>								
<b>TILIACEÆ.</b>								
17. <i>Tilia Americana</i> .....	2	Massachusetts.....	Arnold Arboretum.....	C. S. Sargent.....	Drift.....	0.470	9	20
<i>Lime Tree. Bass Wood. American Linden. Lin. Bee Tree.</i>	124	Michigan.....	Big Rapids.....	W. J. Beal.....	Gravelly.....			
	252	Missouri.....	Allenton.....	G. W. Letterman.....	Alluvial.....	0.270	8	73
	816	Michigan.....	Hersey.....	W. J. Beal.....	Rich loam.....			
	1039	Massachusetts.....	Danvers.....	J. Robinson.....	Moist gravel.....	0.830	2	85
17. <i>Tilia Americana, var. pubescens</i> .....	745	Georgia.....	Bainbridge.....	A. H. Curtiss.....	Low.....	0.800	28	.....
18. <i>Tilia heterophylla</i> .....	285 <sup>1</sup>	Kentucky.....	Cliffs Kentucky river	W. M. Linney.....	Limestone.....			
<i>White Bass Wood. Wahoo.</i>	285 <sup>2</sup>	do.....	Mercer county.....	do.....	do.....			
	285 <sup>3</sup>	do.....	do.....	do.....	do.....			
	320	Tennessee.....	Cumberland river.....	A. Gattinger.....	Alluvial.....			
<b>MALPIGHIACEÆ.</b>								
19. <i>Byrsonima lucida</i> .....	510	Florida.....	Boca Chica Key.....	A. H. Curtiss.....	Coral.....	0.080	21	.....
<i>Tallowberry. Glamberry.</i>	1118	do.....	No-Name Key.....	do.....	do.....			
	1117	do.....	Boca Chica Key.....	do.....	do.....	0.074	10	12
	1190	do.....	No-Name Key.....	do.....	do.....			
<b>ZYGOPHYLLACEÆ.</b>								
20. <i>Guaiaacum sanctum</i> .....?	476	do.....	Upper Metacombe Key.	do.....	do.....	0.178	18	55
<i>Lignumvita.</i>	898	do.....	do.....	Department of Agriculture.				
	1183	do.....	Elliott's Key.....	A. H. Curtiss.....	Coral.....			
21. <i>Porliera angustifolia</i> .....	947	Texas.....	San Antonio.....	C. Mohr.....	Limestone.....	0.056	81	.....
<b>RUTACEÆ.</b>								
22. <i>Xanthoxylum Americanum</i> .....	80	Missouri.....	Allenton.....	G. W. Letterman.....	Alluvial.....	0.087	5	0
<i>Prickly Ash. Toothache Tree.</i>	892	Michigan.....	Lansing.....	W. J. Beal.....	do.....	0.068	4	23

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.6000	0.6000		0.6040	5.60	5.77	5.68		477	
0.7272	0.7315		0.7293	3.82	3.88	3.85		1188	
			0.6971			4.76	43.44		
0.9570	0.9598		0.9582	0.75	0.95	0.85		All sap-wood ..... 499	
1.0390	1.0017		1.0203	2.66	2.65	2.66		0.5 sap-wood ..... 1131	
			0.9893			1.75	61.65		
0.3852	0.4059		0.4255	0.49	0.44	0.47		236	
0.5146	0.5255		0.5201	1.02	1.08	1.05		414	
			0.4728			0.76	29.47		
0.6995	0.7286		0.7142	1.51	1.80	1.69	44.51	1280	
0.4026	0.4722		0.4074	0.30	0.33	0.31		2	
0.3815			0.3815	0.32	0.38	0.35		124	
0.5035	0.4378		0.4706	0.97	1.08	1.02		252	
0.5106			0.5106	0.55	0.64	0.60		All sap-wood ..... 316	
0.4272	0.4108	0.4962	0.4266	0.42	0.48	0.45		1039	
			0.4525			0.55	28.20		
0.4103	0.3885		0.4074	0.68	0.67	0.65	25.39	Growth very rapid ..... 745	
0.4087	0.4220			0.62	0.64				
0.4027			0.4027	0.45		0.45		Second growth ..... 285 <sup>1</sup>	
0.3791			0.3791	0.67		0.67		285 <sup>2</sup>	
0.3674			0.3674	0.86		0.86		285 <sup>3</sup>	
0.4095	0.4545		0.4620	0.48	0.53	0.50		320	
			0.4253			0.62	26.51		
0.5257	0.5360		0.5308	2.34	2.35	2.35		510	
0.5909	0.6733	0.6743	0.6478	2.40	1.94	2.17		1113	
0.5681	0.5791	0.5875	0.5782	2.75	2.56	2.65		1119	
0.6009	0.5964		0.5987	1.94	2.40	2.17		1190	
			0.5888			2.46	36.69		
1.1845	1.2180	0.9563	1.1196	0.87	0.92	0.90		0.5 sap-wood ..... 476	
1.2736	1.1700		1.2218	0.51	0.81	0.66		Second sp. gr. determination made on 0.5 sap-wood ..... 898	
1.0997	1.0998	1.0652	1.0882	0.86	0.94	0.90		0.66 sap-wood ..... 1133	
			1.1432			0.82	71.24		
1.1280	1.0843	1.1230	1.1101	0.53	0.40	0.51	69.18	Sap-wood ..... 947	
0.6122	0.5969		0.6045	0.60	0.58	0.59		80	
0.5235	0.5290		0.5262	0.54	0.55	0.54		392	
			0.5654			0.57	35.23		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.		
							Sap-wood.	Heart-wood.	
23. <i>Xanthoxylum Clava-Herculis</i> ..... <i>Toothache Tree. Prickly Ash. Sea Ash. Pepper Wood. Wild Orange.</i>	735	Florida	Chattahoochee	A. H. Curtiss	Dry, sandy				
	807	Georgia	Cumberland Island	do					
	1080	Texas	Palestine	C. Mohr	Damp, sandy	0.352	20	10	
23. <i>Xanthoxylum Clava-Herculis, var. fruticosum</i> .....	938	do	Austin	do	Dry, calcareous	0.098	33		
24. <i>Xanthoxylum Caribaeum</i> ..... <i>Satin Wood.</i>	1109	Florida	Bahia Honda Key	A. H. Curtiss	Coral				
	1140	do	do	do	do	0.136	4	54	
25. <i>Xanthoxylum Pterota</i> ..... <i>Wild Lime.</i>	481	do	Bay Biscayne	A. H. Curtiss	Coral				
	950	Texas	Matagorda bay	C. Mohr	Calcareous				
	1128	Florida	Bay Biscayne	A. H. Curtiss	Coral	0.84	13	31	
26. <i>Ptelia trifoliata</i> ..... <i>Hop Tree. Shrubby Trefoil. Wafer Ash.</i>	768	do	Aspaluga	do	Calcareous	0.04	23		
27. <i>Canotia holocantha</i> .....	1228	Arizona	Wickenburg	C. G. Pringle					
SIMARUBEAE.									
28. <i>Simaruba glauca</i> ..... <i>Paradise Tree.</i>	487	Florida	Bay Biscayne	A. H. Curtiss	Coral				
BURSERACEAE.									
29. <i>Bursera gummifera</i> ..... <i>Gum Elemi. Gumbo Limbo. West Indian Birch.</i>	462	do	Upper Metacombe Key	do	do				
	903	do		Department of Agriculture.					
30. <i>Amyris sylvatica</i> ..... <i>Torch Wood.</i>	475	do	Upper Metacombe Key	A. H. Curtiss	Coral	0.128	61		
MELIACEAE.									
31. <i>Swietenia Mahagoni</i> ..... <i>Mahogany. Madra.</i>	452	do	do	do	do	0.228	10	31	
OLACINAE.									
32. <i>Ximenia Americana</i> ..... <i>Wild Lime. Tallow Nut. Hog Plum. Mountain Plum.</i>	472	do	do	do	do	0.112	3	43	
	1184	do	Umbrella Key	do	do				
ILICINAE.									
33. <i>Ilex opaca</i> ..... <i>American Holly.</i>	280	South Carolina	Waverly Mills	W. St. J. Mazyek	Sandy loam	0.144	35		
	302	do		Department of Agriculture.					
34. <i>Ilex Dahoon</i> ..... <i>Dahoon. Dahoon Holly.</i>	484	Florida	Bay Biscayne	A. H. Curtiss	Low, damp	0.128	29		
34. <i>Ilex Dahoon, var. myrtifolia</i> .....	302	do	Jacksonville	do	do	0.148	28		

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5139	0.5002	.....	0.5070	0.92	0.91	0.91	.....	735	
0.4880	0.4772	.....	0.4826	0.68	0.65	0.67	.....	807	
0.5302	0.5153	.....	0.5272	0.90	0.84	0.87	.....	1086	
			0.5050			0.82	31.51		
0.6130	0.5733	0.6030	0.5907	0.76	0.76	0.76	37.19	838	
0.8598	0.8965	.....	0.8782	1.59	2.01	1.80	.....	1109	
0.9090	0.9275	0.9302	0.9222	2.34	2.15	2.25	.....	1140	
			0.9002			2.02	56.10		
0.7480	0.7666	.....	0.7573	0.90	1.00	0.95	.....	481	
0.5807	0.5775	.....	0.5791	0.68	0.59	0.61	.....	950	
0.9000	0.8940	0.8955	0.8968	0.60	0.89	0.79	.....	1123	
			0.7444			0.78	46.39		
0.8238	0.8400	.....	0.8319	0.34	0.27	0.30	51.84	768	
0.6464	0.7305	.....	0.6885	6.13	4.54	5.33	42.01	1223	
0.4100	0.4172	.....	0.4130	0.93	0.92	0.93	25.78	487	
0.2677	0.2488	0.2587	0.2584	2.05	1.91	1.98	.....	462	
0.2823	0.4022	.....	0.3428	2.10	2.07	2.09	.....	908	
			0.3003			2.04	18.71		
1.0469	1.0450	.....	1.0450	0.60	0.51	0.59	65.18	475	
0.7335	0.7464	0.7047	0.7282	1.06	1.11	1.09	45.38	452	
0.8700	0.8925	.....	0.8862	0.55	0.69	0.62	.....	472	
0.9838	0.9505	0.9249	0.9531	0.84	0.82	0.83	.....	1184	
			0.9196			0.73	57.31		
0.6046	0.6024	.....	0.6035	0.71	0.55	0.63	.....	280	
0.5524	0.5078	.....	0.5301	1.04	0.71	0.88	.....	802	
			0.5818			0.76	36.26		
0.4701	0.4820	.....	0.4806	0.94	0.88	0.91	29.95	484	
0.5886	0.5800	.....	0.5873	0.95	0.84	0.90	33.60	803	

0.5 sap-wood

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.		
							Sap-wood.	Heart-wood.	
35. <i>Ilex Cassine</i> ..... <i>Cassena. Yaupon. Yupon.</i>	345	Alabama	Cottage Hill	C. Mohr	Sandy	0.076	17		
	804	Florida	Saint John's river	A. H. Curtiss	Rich, sandy				
	952	Texas	Matagorda bay	C. Mohr	Light				
36 <i>Ilex decidua</i> .....	56	Missouri	Allenton	G. W. Letterman	Low, damp				
	885	Texas	Dallas	J. Reverchon	Upland				
	753	Florida	Chattahoochee river	A. H. Curtiss	Clay	0.086	88		
	945	Texas	New Braunfels	C. Mohr	Alluvial				
CYRILLACEÆ.									
37. <i>Cyrilla racemiflora</i> ..... <i>Iron Wood.</i>	341	Alabama	Chunchula	do	Damp, sandy	0.105			
	615	Georgia	Ogeechee river	A. H. Curtiss	Low				
38. <i>Cliftonia ligustrina</i> ..... <i>Wt. Iron Wood. Buckwheat Tree.</i>	338	Alabama	Cottage Hill	C. Mohr	Wet	0.194	47		
CELASTRACEÆ.									
39. <i>Euonymus atropurpureus</i> ..... <i>Burning Bush. Wahoo. Spindle Tree. Arrow Wood.</i>	63	Missouri	Allenton	G. W. Letterman	Alluvial				
	1078	do	do	do	do	0.092	22		
40. <i>Myginda pallens</i> .....	1188	Florida	Umbrella Key	A. H. Curtiss	Calcareous				
41. <i>Schrefferia frutescens</i> ..... <i>Yellow Wood. Box Wood.</i>	478	do	Upper Metacombe Key	do	Coral	0.110	71		
	1201	do	do	do	do				
RHAMNACEÆ.									
42. <i>Reynosa latifolia</i> ..... <i>Red Iron Wood. Darling Plum.</i>	454	do	do	do	do	0.112	7	52	
43. <i>Condalia ferrea</i> ..... <i>Black Iron Wood.</i>	460	do	do	do	do	0.166	22	56	
44. <i>Condalia obovata</i> ..... <i>Blue Wood. Logwood. Purple Haze.</i>	941	Texas	New Braunfels	C. Mohr	Dry, calcareous	0.100	5	36	
45. <i>Rhamnus Caroliniana</i> ..... <i>Indian Cherry</i>	43	Missouri	Allenton	G. W. Letterman	Limestone				
	521	Tennessee	Nashville	A. Gattinger	do				
	808	Florida	Saint John's river	A. H. Curtiss	Rich hummock	0.108	19	10	
	1094	Arkansas	Jonesboro'	T. B. Kitchens		0.050	14		
46. <i>Rhamnus Californica</i> .....	1256	California	Santa Cruz mountains	C. G. Pringle					
47. <i>Rhamnus Purshiana</i> ..... <i>Bearberry. Bear Wood. Shittim Wood.</i>	993	Oregon	Portland	G. Engelmann and C. S. Sargent	Rich, alluvial				
48. <i>Ceanothus thyrsiflorus</i> ..... <i>Blue Myrtle.</i>	1101	California	Santa Cruz	C. L. Anderson		0.090	11		

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
J. 7257	0. 7185	.....	0. 7221	0. 74	0. 70	0. 72	.....	845	
0. 6890	0. 7191	.....	0. 7041	1. 04	1. 11	1. 08	.....	804	
0. 7476	0. 7619	.....	0. 7547	6. 80	0. 72	0. 81	.....	952	
			0. 7270			0. 87	45. 31		
0. 7076	.....	.....	0. 7076	0. 44	0. 50	0. 47	.....	58	
0. 7888	.....	.....	0. 7888	0. 83	0. 84	0. 84	.....	395	
0. 5010	0. 5861	.....	0. 5885	0. 87	0. 70	0. 83	.....	753	
0. 7000	0. 7894	0. 7939	0. 7931	0. 07	0. 07	0. 07	.....	945	
			0. 7420			0. 70	46. 25		
0. 7147	0. 6563	.....	0. 6855	0. 41	0. 43	0. 42	.....	841	
0. 6818	0. 6608	.....	0. 6713	0. 42	0. 40	0. 41	.....	615	
			0. 6784			0. 42	42. 23		
0. 6350	0. 6147	.....	0. 6249	0. 35	0. 48	0. 42	38. 05	388	
0. 0240	.....	.....	0. 0240	0. 70	0. 58	0. 64	.....	63	
0. 0868	0. 7018	.....	0. 6943	0. 51	0. 59	0. 53	.....	1078	
			0. 6592			0. 58	41. 08		
0. 9057	0. 9039	.....	0. 9048	3. 88	2. 95	3. 42	56. 39	1188	
0. 7487	0. 7728	.....	0. 7608	2. 79	2. 91	2. 85	.....	478	
0. 7012	0. 7850	.....	0. 7881	2. 16	2. 28	2. 22	.....	1201	
			0. 7745			2. 54	48. 27		
1. 0605	1. 0825	.....	1. 0715	3. 24	3. 15	3. 20	66. 78	454	
1. 3020	1. 3020	.....	1. 3020	8. 00	8. 01	8. 31	81. 14	460	
1. 2049	1. 1949	.....	1. 1990	7. 03	7. 02	7. 03	74. 78	0. 125 sap-wood..... 941	
0. 5954	.....	.....	0. 5054	0. 10	0. 18	0. 10	.....	48	
0. 5940	0. 5902	.....	0. 5951	0. 70	0. 98	0. 87	.....	521	
0. 4071	0. 5301	.....	0. 5186	0. 47	0. 52	0. 50	.....	All sap-wood..... 803	
0. 4894	0. 4720	}	0. 4807	1. 15	0. 81	0. 98	.....	0. 5 sap-wood..... 1094	
0. 4780	0. 4825								
			0. 5402			0. 64	34. 04		
0. 6000	.....	.....	0. 6000	0. 03	0. 53	0. 53	37. 39	1256	
0. 5665	0. 5678	.....	0. 5672	0. 74	0. 50	0. 67	35. 35	0. 25 sap-wood..... 998	
0. 5805	0. 5604	}	0. 5750	0. 70	0. 68	0. 60	35. 83	Growth rapid..... 1101	
0. 5905	0. 5625								

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
49. <i>Colubrina reclinata</i> ..... <i>Naked Wood.</i>	502	Florida	Umbrella Key	A. H. Curtiss	Coral	0.126	6	45
	1139	do	do	do	do	0.100	13	24
SAPINDACEÆ.								
50. <i>Aesculus glabra</i> ..... <i>Ohio Buckeye. Fetid Buckeye.</i>	297	Missouri	Allenton	G. W. Letterman	Rich, moist			
	380	do	do	do	Alluvial			
	427	Tennessee	Nashville	A. Gatlinger	Rich, moist			
51. <i>Aesculus flava</i> ..... <i>Sweet Buckeye.</i>	445	do	do	do	Rich upland			
52. <i>Aesculus Californica</i> ..... <i>California Buckeye.</i>	684	California	Marin county	G. B. Vasey	do	0.250		
53. <i>Ungnadia speciosa</i> ..... <i>Spanish Buckeye.</i>	944	Texas	New Braunfels	C. Mohr	Limestone	0.124	26	
54. <i>Sapindus marginatus</i> ..... <i>Wild China. Soapberry.</i>	307	do	Dallas	J. Reverchon	Rich, damp			
	589	do	do	do	do			
	824	New Mexico	Rio Gila cañon	E. L. Greene	do			
	928	Texas	Austin	C. Mohr	Limestone	0.222	24	36
55. <i>Sapindus Saponaria</i> ..... <i>Soapberry.</i>	568	Florida	Cape Sable	A. H. Curtiss	Rich, sandy, damp	0.134	41	
	1122	do	Key Largo	do	Coral			
56. <i>Hypelate paniculata</i> ..... <i>Ink Wood. Iron Wood.</i>	463	do	Upper Metacombe Key	do	do	0.202	15	80
57. <i>Hypelate trifoliata</i> ..... <i>White Iron Wood.</i>	464	do	do	do	do	0.224	13	72
58. <i>Acer Pennsylvanicum</i> ..... <i>Striped Maple. Moose Wood. Striped Dogwood. Goose-foot Maple. Whistle Wood.</i>	99	Vermont	Huntingdon	C. G. Pringle	Gravelly			
	872	do	do	do	do			
59. <i>Acer spicatum</i> ..... <i>Mountain Maple.</i>	98	do	do	do	do			
	371	do	do	do	do			
60. <i>Acer macrophyllum</i> ..... <i>Broad-leaved Maple.</i>	982	Oregon	Portland	G. Englemann and C. S. Sargent	Rich, alluvial	0.220	30	40
	1023	do	Portland Furniture Company	do	do			
61. <i>Acer circinatum</i> ..... <i>Pine Maple.</i>	962	do	Portland	do	Moist, alluvial			
	1013	do	do	do	do			
	1014	Washington territory.	Wilkeson	do	do			
62. <i>Acer glabrum</i> ..... <i>Dwarf Maple.</i>	526	Colorado	Englemann's cañon	R. Douglas	Dry, gravelly	0.048	28	

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.8100	0.8516		0.8308	1.20	1.14	1.21		502	
0.8046	0.8166	0.8112	0.8108	2.31	2.26	2.20		1139	
			0.8208			1.75	51.15		
0.4270	0.4358		0.4314	1.01	1.00	1.01		297	
0.4787	0.4025		0.4700	0.83	0.85	0.84		356	
0.4006			0.4606	0.77	0.68	0.73		427	
			0.4542			0.86	28.31		
0.4241	0.4307		0.4274	0.99	1.00	1.00	27.24	445	
0.4021	0.5038		0.4080	0.66	0.73	0.70	31.04	634	
0.6392	0.0272		0.6332	1.15	1.19	1.17	39.46	644	
0.7520	0.7930		0.7750	1.42	1.27	1.35		397	
0.8324	0.8016		0.8470	1.86	1.52	1.69		569	
0.7978	0.8345		0.8162	1.44		1.44		824	
0.7550	0.8522	0.8290	0.8123	1.54	1.52	1.53		928	
			0.8126			1.50	50.64		
0.8595	0.6703		0.8070	3.82	3.30	3.56		568	
0.7940	0.8024	0.8204	0.8050	5.00	5.25	5.13		1122	
			0.8367			4.34	52.14		
0.9600	0.9465		0.9533	1.23	1.27	1.25	59.41	463	
0.9050	0.8548		0.9102	1.35	1.41	1.38	56.72	464	
0.5111	0.5110		0.5115	0.32	0.35	0.34		99	
0.5564	0.5100	0.5789	0.5464	0.44	0.30	0.37		372	
			0.5290			0.36	33.02		
0.5198	0.5205		0.5202	0.42	0.37	0.40		98	
0.5490	0.5528	0.5363	0.5457	0.48	0.41	0.45		371	
			0.5330			0.43	33.22		
0.5057	0.5020	0.5254	0.5113	0.50	0.57	0.58		982	
0.4823	0.5087		0.4705	0.40	0.49	0.49		1023	
			0.4909			0.54	30.59		
0.6824	0.6720		0.6772	0.39	0.30	0.30		962	
0.6587	0.6660		0.6624	0.35	0.37	0.36		1013	
0.6370	0.6800		0.6535	0.41	0.44	0.43		1014	
			0.6600			0.39	41.51		
0.6032	0.6023		0.6028	0.31	0.29	0.30	37.57	523	

All sap-wood

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.		
							Sap-wood.	Heart-wood.	
63. <i>Acer grandidentatum</i> .....	880	Utah .....	City Creek cañon ..	M. E. Jones .....	Moist, gravelly ..	0.050	12	.....	
64. <i>Acer saccharinum</i> .....	105	Vermont.....	.....	C. G. Pringle.....	Gravelly.....	.....	.....	.....	
	203	Ohio .....	Woodsum Machine Company.	E. E. Barney.....	.....	.....	.....	.....	
	208	Missouri.....	Allenton.....	G. W. Letterman.....	Rich uplands .....	.....	.....	.....	
	209	do .....	do .....	do .....	do .....	.....	.....	.....	
	376	Vermont.....	Charlotte .....	C. G. Pringle.....	Gravelly.....	.....	.....	.....	
	409	New England.....	Charlestown Navy-yard.	S. H. Pook .....	.....	.....	.....	.....	
	1238	Vermont.....	Charlotte .....	F. H. Horsford .....	.....	.....	.....	.....	
1234	do .....	do .....	do .....	.....	.....	.....	.....		
1235	do .....	do .....	do .....	.....	.....	.....	.....		
64. <i>Acer saccharinum, var. nigrum</i> .....	213	do .....	do .....	C. G. Pringle.....	Clay .....	.....	.....	.....	
	274 <sup>1</sup>	Missouri.....	Allenton.....	G. W. Letterman.....	Low, alluvial .....	.....	.....	.....	
	274 <sup>2</sup>	do .....	do .....	do .....	Rich, alluvial .....	.....	.....	.....	
	399	do .....	do .....	do .....	Low, alluvial .....	.....	.....	.....	
	440	Tennessee.....	Nashville .....	A. Gattinger.....	Rich .....	.....	.....	.....	
	757	Florida .....	Chattahoochee.....	A. H. Curtiss .....	Clay .....	0.268	51	.....	
	1167	Missouri.....	Allenton.....	G. W. Letterman.....	Rich, alluvial .....	.....	.....	.....	
65. <i>Acer dasycarpum</i> .....	103	Vermont.....	Charlotte .....	C. G. Pringle.....	Swampy .....	.....	.....	.....	
	367	do .....	do .....	do .....	do .....	.....	.....	.....	
	448	Missouri.....	Allenton.....	G. W. Letterman.....	.....	.....	.....	.....	
	1052	Massachusetts.....	Topsfield .....	J. Robinson.....	Low meadow .....	.....	.....	.....	
66. <i>Acer rubrum</i> .....	20	do .....	Arnold Arboretum.....	C. S. Sargent.....	Drift .....	0.285	18	39	
	530	Mississippi.....	Kemper's mill .....	C. Mohr.....	Rich, swampy .....	0.222	41	.....	
	748	Georgia .....	Bainbridge .....	A. H. Curtiss .....	Low .....	0.252	22	54	
	878	Massachusetts.....	Danvers .....	J. Robinson.....	do .....	0.108	30	3	
	1048	do .....	North Reading .....	do .....	do .....	0.204	60	0	
66. <i>Acer rubrum, var. Drummondii</i> .....	1239	Missouri.....	Poplar Bluff .....	G. W. Letterman .....	.....	.....	.....	.....	
	1240	do .....	do .....	do .....	.....	.....	.....	.....	
67. <i>Negundo aceroides</i> .....	290	Missouri.....	Allenton.....	G. W. Letterman.....	Rich bottom .....	.....	.....	.....	
	311	Texas .....	Dallas .....	J. Reverchon .....	do .....	.....	.....	.....	
68. <i>Negundo Californicum</i> .....	645	California.....	Contra Costa county	G. R. Vasey.....	Rich, moist .....	0.240	14	.....	
ANACARDIACEÆ.									
69. <i>Rhus cotinoides</i> .....	1170	Alabama.....	Huntsville.....	C. Mohr .....	Rich loam .....	.....	.....	.....	

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7012	0.6791		0.6902	0.66	0.61	0.64	43.01		886
0.6139	0.6003		0.6071	0.44	0.40	0.42			105
0.6303	0.6300		0.6332	0.51	0.45	0.48			203
0.7097	0.8098		0.7898	0.54	0.59	0.57			298
0.7828	0.7689		0.7759	0.60	0.57	0.59			299
0.6538	0.6789		0.6601	0.93	1.10	1.02			376
0.6242			0.6242	0.36	0.44	0.40			409
0.7100			0.7100	0.91	0.33	0.62			1233
0.6893	0.6899		0.6896	0.33	0.29	0.31			1234
0.7289			0.7230	0.48	0.35	0.42			1235
			0.6912			0.54	43.08		
0.7319	0.6935	0.6639	0.6964	1.48	1.01	1.25			213
0.7240	0.6980		0.7115	0.50		0.56			274 <sup>1</sup>
0.7214	0.7002		0.7108	0.52		0.52			274 <sup>2</sup>
0.7117	0.6799		0.6958	0.70	0.56	0.63			399
0.6410	0.6429		0.6419	1.31	1.02	1.17			440
0.6808	0.7008	0.7105	0.7014	0.55	0.33	0.44			757
0.6814	0.6840		0.6827	0.42	0.36	0.39			1167
			0.6945			0.71	43.09		
0.4880	0.5254		0.5072	0.31	0.32	0.32			103
0.4800	0.4828		0.4844	0.39	0.31	0.31			367
0.4700	0.5062		0.4911	0.40	0.42	0.41			448
0.6247	0.6163	0.6344	0.6251	0.29	0.27	0.28			1052
			0.5209			0.33	32.84		
0.6761	0.6845		0.6803	0.24	0.25	0.25		All sap-wood	20
0.5770	0.6064		0.5917	0.43	0.42	0.43			530
0.5288	0.5510	0.5001	0.5406	0.49	0.49	0.49			743
0.6397	0.6490	0.6406	0.6433	0.32	0.33	0.33		Second and third sp. gr. determinations made on sap-wood	878
0.6374	0.6185	0.6260	0.6273	0.38	0.32	0.35			1048
			0.6178			0.37	38.50		
0.5563			0.5563	0.31	0.31	0.31			1239
0.5355			0.5355	0.36	0.36	0.36			1240
			0.5459			0.34	34.02		
0.4332	0.4288		0.4310	0.76	1.22	0.99			290
0.4217	0.4474		0.4346	1.01	1.30	1.16			311
			0.4328			1.07	20.97		
0.4786	0.4856		0.4821	0.51	0.57	0.54	30.04		645
0.6196	0.6393	0.6680	0.6425	0.48	0.51	0.50	40.04		1176

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
70. <i>Rhus typhina</i> ..... <i>Staghorn Sumach.</i>	158	Vermont.....	Hinesburgh.....	C. G. Pringle.....	Gravelly.....			
	1060	Massachusetts....	Danvers.....	J. Robinson.....	do.....	0.120	2	34
71. <i>Rhus copallina</i> ..... <i>Dwarf Sumach.</i>	70	Missouri.....	Allenton.....	G. W. Letterman ..	Moist limestone..			
	610	Georgia.....	Lower Altamaha river.	A. H. Curtiss ..	Dry, clay.....			
	736	Florida.....	Chattahoochee river.	do.....	do.....	0.175	5	10
71. <i>Rhus copallina, var. lanceolata</i> .....	330	Texas.....	Dallas.....	J. Reverchon ..	Dry, gravelly ..			
72. <i>Rhus venenata</i> ..... <i>Poison Sumach. Poison Elder.</i>	876	Massachusetts....	Danvers.....	J. Robinson.....	Wet, swampy.....	0.070	1	20
	1037	do.....	do.....	do.....	do.....	0.085	4	16
	1041	do.....	do.....	do.....	do.....	0.067	4	27
73. <i>Rhus Metopium</i> ..... <i>Poison Wood, Coral Sumach. Mount-ain Manchinesel. Bum Wood. Hog Plum. Doctor Gum.</i>	467	Florida.....	Upper Metacombo Key.	A. H. Curtiss ..	Coral.....	0.222	39	39
LEGUMINOSÆ.								
75. <i>Eysenhardtia orthocarpa</i> .....	1147	Arizona.....	Santa Rita mount-ains.	C. G. Pringle.....	Dry, rocky.....			
76. <i>Dalca spinosa</i> .....	1070	California.....	Agua Caliente.....	Parish Brothers ..	Dry, sandy.....			
77. <i>Robinia Pseudacacia</i> ..... <i>Locust. Black Locust. Yellow Locust.</i>	405	.....	Charlestown Navy-yard.	S. H. Pook ..	.....			
	441	Tennessee.....	Nashville.....	A. Gatlinger ..	Limestone.....			
	815	West Virginia....	Grafton.....	C. G. Pringle ..	.....			
	845	Massachusetts....	Danvers.....	J. Robinson ..	Gravelly.....	0.184	4	35
78. <i>Robinia viscosa</i> ..... <i>Clammy Locust.</i>	1061	do.....	do.....	do.....	Loam.....	0.060	4	8
79. <i>Robinia Neo-Mexicana</i> ..... <i>Locust.</i>	1031	Colorado.....	Trinidad.....	W. B. Strong ..	Low, moist.....			
80. <i>Olneya Tesota</i> ..... <i>Iron Wood. Arbol de Hierro.</i>	650	California.....	Lower Colorado valley.	G. Engelmann and C. S. Sargent.	Dry, gravelly ..			
81. <i>Piscidia Erythrina</i> ..... <i>Jamaica Dogwood.</i>	564	Florida.....	Upper Metacombo Key.	A. H. Curtiss ..	Coral.....			
82. <i>Cladrastis tinctoria</i> ..... <i>Yellow Wood. Yellow Ash. Gopher Wood.</i>	33	Kentucky.....	Mercer county.....	W. M. Linney ..	Limestone.....			
	430	Tennessee.....	Nashville.....	A. Gatlinger ..	Alluvial.....			
83. <i>Sophora secundiflora</i> ..... <i>Frigolito.</i>	940	Texas.....	New Braunfels.....	C. Mohr ..	Limestone.....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4476	0.4593		0.4535	0.43	0.54	0.49		158	
{ 0.4079	{ 0.4855		0.4179	0.52	0.52	0.52		1060	
{ 0.3912	{ 0.3869		0.4357			0.50	27.15		
0.4907	0.5080		0.5039	0.62	0.62	0.62		70	
0.5478	0.5579		0.5529	0.63	0.59	0.60		610	
0.5472	0.4910	0.5307	0.5250	0.55	0.60	0.57		730	
			0.5273			0.60	32.86		
0.5131	0.5236		0.5184	0.80	0.80	0.85	32.81	330	
{ 0.4383	{ 0.4362		0.4326	0.90	0.88	0.80		870	
{ 0.4192	{ 0.4368								
{ 0.4365	{ 0.4322		0.4418	0.49	0.49	0.49		1037	
{ 0.4535	{ 0.4449								
0.4250	0.4511	0.4440	0.4403	0.50	0.60	0.55		1041	
			0.4382			0.64	27.31		
0.8106	0.7728		0.7917	2.31	2.47	2.39	49.34	407	
0.8601	0.8884	0.8640	0.8740	1.20	1.23	1.23	54.47	0.125 sap-wood ..... 1147	
{ 0.5714	{ 0.5904		0.5590	3.41	4.08	4.04	34.50	First, second, and third sp. gr. determinations made on sap-wood; fourth sp. gr. determination made on 0.1 sap-wood. 1070	
{ 0.5285	{ 0.5241								
0.7550	0.7904		0.7727	0.22	0.26	0.24		405	
0.7908			0.7908	1.26	1.19	1.19		441	
0.6400	0.6387		0.6439	0.35		0.35		815	
0.7410	0.7279	0.7087	0.7250	0.22	0.25	0.24		Third sp. gr. determination made on sap-wood. Cultivated ..... 845	
			0.7388			0.51	45.70		
{ 0.8130	{ 0.8017		0.8094	0.22	0.19	0.20	50.44	0.125 sap-wood. Cultivated ..... 1061	
{ 0.7942	{ 0.8287								
0.7988	0.7855	0.8258	0.8084	0.62	0.58	0.60	50.07	1031	
{ 0.8953	{ 0.9600		1.0602	1.85	2.15	2.20	66.07	650	
{ 1.1542	{ 1.1542	1.1374		2.75	2.43				
0.8770	0.8689		0.8734	3.42	3.34	3.38	51.43	564	
0.6072	0.6485		0.6278	0.21	0.17	0.19		93	
0.6277			0.6277	0.39	0.36	0.38		430	
			0.6278			0.28	39.12		
1.0310	0.9890	0.9825	0.9842	1.44	1.74	1.50	61.31	First and second sp. gr. determinations made on sap-wood ..... 940	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
84. <i>Sophora affinis</i> .....	320	Texas	Dallas	J. Roverchon	Dry, calcareous			
	932	do	Austin	C. Mohr	do	0.084	10	16
85. <i>Gymnocladus Canadensis</i> ..... <i>Kentucky Coffee Tree. Coffee Nut.</i>	206	Missouri	Allenton	G. W. Letterman	Low, rich			
	402	do	do	do	Alluvial			
	519	Tennessee	Nashville	A. Gattinger	Limestone			
86. <i>Gleditsia triacanthos</i> ..... <i>Honey Locust. Black Locust. Three-thorned Acacia. Sweet Locust. Honey Shucks.</i>	531	Missouri	Allenton	G. W. Letterman	Low, rich			
	533	do	do	do	do			
	444	Tennessee	Nashville	A. Gattinger	Dry, sandy barren			
87. <i>Gleditsia monosperma</i> ..... <i>Water Locust.</i>	760	Florida	Chattahoochee river.	A. H. Curtiss	Alluvial	0.294	21	26
88. <i>Parkinsonia Torreyana</i> ..... <i>Green-bark Acacia. Palo Verde.</i>	678	Arizona	Lower Colorado river.	G. Engelmann and C. S. Sargent.	Sandy			
89. <i>Parkinsonia microphylla</i> .....	1258	do	Valley of the Gila river.	C. G. Pringle				
90. <i>Parkinsonia aculeata</i> .....	820	Florida		Department of Agriculture.				
	1208	Texas	Austin	S. B. Buckley				
91. <i>Cercis Canadensis</i> ..... <i>Redbud. Judas Tree.</i>	50	Missouri	Allenton	G. W. Letterman	Low, rich	0.260	5	35
	436	Tennessee	Nashville	A. Gattinger	Limestone			
	1089	Missouri	Allenton	G. W. Letterman	Rich			
	1090	do	do	do	do			
	1091	do	do	do	do			
92. <i>Cercis reniformis</i> ..... <i>Redbud.</i>	1142	Texas	Austin	S. B. Buckley	Limestone			
93. <i>Prosopis juliflora</i> ..... <i>Mesquit. Algaroba. Honey Locust. Honey Pod.</i>	561	do	Fort Stockton	B. L. Baldrige	Light, sandy			
	590	Arizona	Tucson	C. S. Sargent.				
	680	do	do	do				
	927	Texas	Austin	C. Mohr	Rich, calcareous			
94. <i>Prosopis pubescens</i> ..... <i>Screw Bean. Screw-pod Mesquit. Tornilla.</i>	600	California	Fort Yuma	G. Engelmann and C. S. Sargent.				
	658	do	do	do	Sandy			
	998	do	do	do		0.064	8	
95. <i>Leucena glauca</i> .....	1224	Mexico	Lampasas mountains	S. B. Buckley				
96. <i>Leucena pulverulenta</i> .....	1222	Texas	Brownsville	do	Sandy			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.8010	0.8161		0.8000	0.42	0.84	0.38		0.25 sap-wood	329
0.8540	0.0816		0.8028	1.04	1.13	1.09		0.5 sap-wood	932
			0.8509			0.73	53.03		
0.0700	0.0786		0.0743	0.70	0.57	0.64			296
0.0003			0.0003	0.45	0.50	0.48			402
0.7305			0.7395	0.98	0.82	0.90			519
			0.0984			0.67	43.21		
0.7330	0.7359		0.7345	0.55	0.61	0.58			531
0.0418	0.0275		0.0346	0.60		0.69			532
0.6528			0.6528	1.20	0.98	1.14			444
			0.0740			0.80	42.00		
0.7509	0.7245	0.7272	0.7342	0.66	0.70	0.73	45.76	First sp. gr. determination made on sap-wood	760
0.0330	0.0782		0.0531	1.25	1.00	1.12	40.70	Second sp. gr. determination made on sap wood	678
0.7176	0.7722		0.7440	4.20	3.08	3.64	49.75		1258
0.0325			0.0325	2.32	2.26	2.20			829
0.5848	0.5908		0.5908	2.17	2.51	2.34			1208
			0.0110			2.32	38.11		
0.0104	0.0070	0.0157	0.0110	0.59	0.59	0.58			59
0.7098			0.7098	0.67	0.67	0.67			436
0.0254	0.5059		0.6107	0.80	0.77	0.79			1089
0.0403	0.6084		0.6289	0.82	0.74	0.78			1090
0.6009	0.6417		0.6213	0.67	0.84	0.76			1091
			0.6363			0.72	39.65		
0.7392	0.7045	0.7502	0.7513	0.76	0.77	0.77	46.32	First and second sp. gr. determinations made on half sap wood	1142
0.8322	0.8664		0.8493	3.35	2.69	3.02		Root	561
0.7137	0.6697		0.7007	1.67	1.71	1.69			500
0.7247	0.7726		0.7457	1.45	2.40	1.97			680
0.7478	0.7020	0.7587	0.7562	2.09	2.00	2.05		0.05 sap-wood	927
			0.7652			2.18	47.13		
0.7772	0.7910		0.7841	1.02	0.98	1.00		Dead tree; 0.75 sap-wood	690
0.7527	0.7930		0.7729	0.91	0.90	0.91		All sap-wood	958
0.7237	0.7278		0.7258	0.95		0.95		All sap-wood	998
			0.7609			0.95	47.42		
0.9265	0.9205		0.9235	3.27	3.31	3.29	57.55		1224
0.6655	0.6801		0.6732	0.90	1.13	1.01	41.95		1222

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
97. <i>Acacia Wrightii</i> <i>Cat's Claw.</i>	1209	Texas	Austin	S. B. Buckley				
98. <i>Acacia Greggii</i> <i>Cat's Claw.</i>	508	Arizona	Santa Rita mount- ains.	G. Engelmann and C. S. Sargent.	Dry, gravelly.			
	607	do	do	do	do			
	893	do	Clifton	E. L. Greene				
100. <i>Lysiloma latisiliqua</i> <i>Wild Tamarind.</i>	509	Florida	Boca Chica Key	A. H. Curtiss	Coral	0.202	14	29
	1112	do	Key Largo	do	do			
101. <i>Pithecolobium Unguis-cati</i> <i>Cat's Claw.</i>	405	do	Upper Metacombe Key.	do	do			
	1108	do	Bahai Honda Key	do	do			
ROSACEÆ.								
102. <i>Chrysobalanus Icaco</i> <i>Cocoa Plum.</i>	480	do	Bay Biscayne	A. H. Curtiss	Swampy	0.100	47	
103. <i>Prunus Americana</i> <i>Wild Plum. Canada Plum. Horse Plum.</i>	68	Missouri	Allenton	G. W. Letterman	Rich uplands			
	220	Vermont	Charlotte	C. G. Pringle	Gravelly			
	334	Texas	Dallas	J. Reverchon	Rich			
104. <i>Prunus angustifolia</i> <i>Chickasaw Plum. Hog Plum.</i>	435	Tennessee	Nashville	A. Gattinger	River bluff			
105. <i>Prunus Pennsylvanica</i> <i>Wild Red Cherry. Pin Cherry. Pigeon Cherry.</i>	233	Vermont	Charlotte	C. G. Pringle	Cold, gravelly			
106. <i>Prunus umbellata</i> <i>Sloe. Mack Sloe.</i>	006	Georgia	Altamaha river	A. H. Curtiss	Clay	0.216	21	24
107. <i>Prunus emarginata, var. mollis</i>	968	Washington ter- ritory.	Wilkeson	G. Engelmann and C. S. Sargent.	Low, rich			
108. <i>Prunus serotina</i> <i>Wild Black Cherry. Rum Cherry.</i>	15	Massachusetts	Roxbury	C. S. Sargent	Gravelly	0.205	9	31
	106	Vermont	Charlotte	C. G. Pringle	do			
	115	Michigan	Dansville	W. J. Beal	do			
	127	Missouri	Allenton	G. W. Letterman	Rich loam			
	148	Illinois	Waukegan	R. Douglas	Gravelly			
	198	Ohio	Barney & Smith Manufacturing Co.	E. E. Barney				
	817	Michigan	Hersey	W. J. Beal	Rich			
	368	Vermont	Charlotte	C. G. Pringle	Gravelly			
	406	Virginia or Mid- dle states.	Charlestown Navy- yard.	S. H. Pook				
	725	Pennsylvania	Williamsport	C. G. Pringle				
768	Florida	Chattahoochee river.	A. H. Curtiss	Clay	0.218	15	48	
1053	Massachusetts	Topsfield	J. Robinson	Gravelly	0.320	11	33	
109. <i>Prunus Capuli</i> <i>Wild Cherry.</i>	204	New Mexico	Pinos Altos mount- ains.	E. L. Greene	Alluvial	0.298	7	12
	418	do	do	do	do			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.9380	0.9404		0.9302	0.63	0.57	0.63	58.53		1209
0.8703			0.8703	0.68	0.80	0.79		0.05 sap-wood	598
0.8162	0.8610		0.8360	0.05		0.95		0.05 sap-wood	607
0.8558			0.8558	1.00		1.00			893
			0.8550			0.91	53.28		
0.6033	0.5003		0.5843	2.00	2.44	2.22			509
0.6901	0.7150	0.6001	0.6987	1.98	2.07	2.03		Rough bark	1112
			0.6418			2.12	40.00		
0.8829	0.8349		0.8589	2.48	2.25	2.37			465
0.8885	1.0135		0.9510	3.00	2.09	2.55			1108
			0.9040			2.46	56.30		
0.7290	0.8129		0.7709	0.87	0.87	0.87	48.04		480
0.6750	0.6745		0.6748	0.11	0.09	0.10			68
0.7035	0.6800		0.6918	0.17	0.21	0.19			220
0.7876	0.8070		0.7978	0.33	0.21	0.27			334
			0.7215			0.18	44.06		
0.6675	0.7092		0.6884	0.28	0.28	0.28	42.90		435
0.5014	0.5031		0.5023	0.30	0.43	0.46	81.30		233
0.8102	0.8242		0.8202	0.14	0.10	0.12	51.11		606
0.4310	0.4694		0.4502	0.18	0.23	0.21	28.06		908
0.7047	0.7079		0.7063	0.13	0.14	0.14		0.5 sap-wood	15
0.5525	0.5539		0.5532	0.13	0.11	0.12			166
0.5800	0.4832		0.5321	0.12	0.15	0.14			115
0.6736	0.6235		0.6486	0.19	0.17	0.18			127
0.6473	0.6508		0.6491	0.11	0.13	0.12			148
0.5075	0.5650		0.5667	0.13	0.11	0.12			198
0.5373	0.5186		0.5280	0.19	0.17	0.18			317
0.5121	0.5351		0.5241	0.14	0.17	0.16			368
0.4080			0.4080	0.06	0.09	0.08			406
0.5734	0.5777		0.5756	0.09	0.10	0.10			725
0.5755	0.5221		0.5488	0.17	0.34	0.25			763
0.6893	0.6857	0.6880	0.6857	0.15	0.17	0.16			1053
			0.5822			0.15	86.28		
0.7282	0.6040		0.7111	0.10	0.12	0.14			294
0.8450	0.8837		0.8648	0.28	0.26	0.27		0.33 sap-wood	418
			0.7879			0.20	49.10		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
110. <i>Prunus demissa</i> ..... <i>Wild Cherry.</i>	637	California.....	Strawberry valley ..	G. Engelmann and C. S. Sargent.	Low, rich .....			
111. <i>Prunus Caroliniana</i> ..... <i>Wild Orange. Mock Orange. Wild Peach.</i>	649	Alabama .....	Mobile.....	C. Mohr .....	Sandy .....			
	806	Florida .....	Jacksonville.....	A. H. Curtiss .....	do .....	0.171	8	61
	916	do .....	Chattahoochee.....	C. Mohr .....	Alluvial .....	0.202	12	50
	1032	do .....	Jacksonville.....	A. H. Curtiss.....	Sandy .....			
	1062	Texas .....	Victoria .....	C. Mohr .....	Rich, moist .....	0.180	26	34
112. <i>Prunus sphaerocarpa</i> .....	1217	Florida .....	Edge of Everglades.	A. H. Curtiss .....	Rocky .....			
113. <i>Prunus ilicifolia</i> .....	1158	California .....	Santa Cruz .....	C. L. Anderson.....		0.206	80	
114. <i>Vauquelinia Torreyi</i> .....	1152	Arizona .....	Santa Rita mount- ains.	C. G. Pringle.....				
115. <i>Cercocarpus ledifolius</i> ..... <i>Mountain Mahogany.</i>	883	Utah .....	City Creek cañon..	M. E. Jones .....	Rocky .....			
	904			Department of Ag- riculture.				
116. <i>Cercocarpus parvifolius</i> .....	825	California.....	Siskiyou county...	G. Engelmann and C. S. Sargent.		0.062	8	27
117. <i>Pyrus coronaria</i> ..... <i>American Crab. Sweet-scented Crab.</i>	805	Delaware .....	Klanuensi .....	W. M. Canby .....	Clay .....			
	1087	Pennsylvania.....	Nazareth .....	J. Henry.....	Moist .....			
	1088	do .....	do .....	do .....	do .....			
118. <i>Pyrus angustifolia</i> .....	313	South Carolina.....	Aiken .....	H. W. Ravenel.....	Rich, damp .....	0.180	25	
119. <i>Pyrus rivularis</i> .....	1002	Oregon .....	Portland.....	G. Engelmann and C. S. Sargent.	Rich hills.....	0.186		
120. <i>Pyrus Americana</i> ..... <i>Mountain Ash.</i>	214	Vermont.....	Charlotte .....	C. G. Pringle.....	Gravelly .....			
	305	do .....	Huntingdon .....	do .....	do .....			
121. <i>Pyrus sambucifolia</i> .....	410	do .....	Mount Mansfield ..	do .....	do .....	0.106	17	
122. <i>Crataegus rivularis</i> .....	885	Utah .....	City Creek cañon ..	M. E. Jones .....	do .....	0.064	14	13
123. <i>Crataegus Douglasii</i> .....	999	Oregon .....	Cascades of the Co- lumbia river.	G. Engelmann and C. S. Sargent.	Rich .....	0.200	28	
124. <i>Crataegus brachyacantha</i> .....	926	Louisiana.....	Webster parish.....	C. Mohr .....	Clay .....			
125. <i>Crataegus arborescens</i> .....	363 <sup>1</sup>	South Carolina .....	Aiken .....	H. W. Ravenel.....	Rich .....			
	363 <sup>2</sup>	do .....	do .....	do .....	do .....			
	607	Georgia.....	Ogeechee .....	A. H. Curtiss .....	Low .....	0.183	46	

OF DRY SPECIMENS OF WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7025	0.6937	0.6890	0.6951	0.51	0.48	0.50	43.32		637
0.9515	0.9855		0.9685	0.32	0.33	0.33			549
0.8874	0.8227	0.8314	0.8472	0.39	0.37	0.38			806
0.7700	0.7707		0.7782	0.44	0.44	0.44			916
0.8030	0.8721		0.8601	0.40	0.40	0.48			1032
0.9030	0.8610	0.8790	0.8810	0.43	0.43	0.43			1062
			0.8688			0.41	54.14		
0.9062	0.8934		0.8998	0.97	0.70	0.87	56.07		1217
0.9885	0.9720		0.9803	0.80	0.76	0.78	61.09		1158
1.1340	1.1408		1.1374	1.44	1.40	1.45	70.88		1152
1.0608	1.0332	1.0400	1.0447	1.27	1.12	1.19		0.125 sap-wood	883
1.0950	1.1080		1.1015	1.00	0.60	0.89			904
			1.0731			1.04	66.87		
0.9365			0.9365	0.45		0.45	58.36		825
0.6973	0.7228	0.7320	0.7174	0.52	0.48	0.50			808
0.6940	0.6792	0.6788	0.6790	0.50	0.38	0.44			1087
0.7402	0.7200	0.7057	0.7240	0.49	0.75	0.62			1088
			0.7048			0.52	43.92		
0.6945	0.6845		0.6895	0.33	0.33	0.33	42.97		313
0.8260	0.8300		0.8310	0.41	0.41	0.41	51.82		1002
0.5345	0.5420	0.5539	0.5438	0.98	1.23	1.11			214
0.5512	0.5410		0.5404	0.56	0.56	0.56		0.25 sap-wood	305
			0.5451			0.83	33.97		
0.5803	0.5963		0.5923	0.39	0.31	0.35	36.94	Sap-wood	410
0.7072	0.7734		0.7703	0.33	0.37	0.35	48.00		885
0.7025	0.6928	0.6898	0.6950	0.29	0.36	0.33	43.31		999
0.6750	0.6835		0.6793	0.37	0.46	0.42	42.33		920
0.6360	0.6230		0.6228	0.63	0.70	0.67			363 <sup>1</sup>
0.6093	0.6225					0.38			363 <sup>2</sup>
0.6203	0.6590		0.6427	0.38		0.65			607
0.6934	0.6999		0.6817	0.62	0.63				
			0.6491			0.57	40.45		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.		
							Sap-wood.	Heart-wood.	
126. <i>Crataegus Crus-galli</i> <i>Cockspur Thorn. Newcastle Thorn.</i>	828	Massachusetts	Brookline	J. Robinson	Loam	0.180			
	1083	Missouri	Allenton	G. W. Letterman	Low, wet				
127. <i>Crataegus coccinea</i> <i>Scarlet Haw. Red Haw. White Thorn.</i>	100	Vermont	Monkton	C. G. Pringle	Gravelly				
128. <i>Crataegus subvillosa</i> <i>Scarlet Haw.</i>	949	Texas	Victoria	C. Mohr	Alluvial	0.180	61		
	1081	Missouri	Saint Louis	H. Eggert		0.106	28		
129. <i>Crataegus tomentosa</i> <i>Black Thorn. Pear Haw.</i>	154	Vermont	Charlotte	C. G. Pringle	Clay				
	426	Tennessee	Nashville	A. Gattinger	Limestone				
130. <i>Crataegus cordata</i> <i>Washington Thorn.</i>	447	do	do	do	Low				
131. <i>Crataegus apiifolia</i> <i>Parsley Haw.</i>	759	Florida	Chattahoochee	A. H. Curtiss	Alluvial	0.080	27		
132. <i>Crataegus spathulata</i> <i>Small-fruited Haw.</i>	800	South Carolina	Aiken	H. W. Ravenel	Rich, damp				
	614	Georgia	Ogeechee river	A. H. Curtiss	Low	0.880	38		
134. <i>Crataegus vestivalis</i> <i>May Haw. Apple Haw.</i>	239	South Carolina	Bonneau's Depot	H. W. Ravenel	Damp, rich				
135. <i>Crataegus flava</i> <i>Summer Haw. Yellow Haw.</i>	801	do	Aiken	do	Dry, fertile	0.224	58		
	560	Florida	Tampa	A. H. Curtiss	Sandy				
135. <i>Crataegus flava, var. pubescens</i> <i>Summer Haw. Red Haw.</i>	767	do	Aspalaga	do	Dry clay	0.142	44		
136. <i>Heteromeles arbutifolia</i> <i>Toyon. Tollyon. California Holly.</i>	1160	California	Santa Cruz	C. L. Anderson		0.184	21	34	
137. <i>Amelanchier Canadensis</i> <i>Juneberry. Shad Bush. Service Tree. May Cherry.</i>	156	Vermont	Charlotte	C. G. Pringle	Gravelly				
	241	Kentucky	Brumfield Station	W. M. Linney	Wavory shale	0.140	34	69	
	849	Massachusetts	Danvers	J. Robinson	Loam	0.190	43	21	
HAMAMELACEAE.									
138. <i>Hamamelis Virginica</i> <i>Witch Hazel.</i>	867	do	Beverly	do	Rocky				
	875	do	Danvers	do	do				
	1250	Tennessee	Montvale	A. H. Curtiss					
139. <i>Liquidambar Styraciflua</i> <i>Sweet Gum. Star-leaved Gum. Liquidamber. Red Gum. Bilsted.</i>	546	Alabama	Kemper's mill	C. Mohr	Rich, alluvial				
	1095	Arkansas	Little Rock	G. W. Letterman					
	1173	New Jersey	Mount Holly	S. P. Sharples	Clay	0.208	30	17	
	1181	Mississippi	Yazoo River bottom	R. Abbey	Alluvial				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.6590	0.6705	0.6632	0.6642	0.57	0.55	0.56	Cultivated	328	
0.7781	0.7667	0.7791	0.7746	0.40	0.60	0.55		1093	
			0.7194			0.56	44.83		
0.8054	0.8582		0.8018	0.36	0.40	0.38	53.71	100	
0.7909	0.7144		0.7527	0.77	0.78	0.78		949	
0.8376	0.8382		0.8370	0.54	0.68	0.61		1081	
			0.7953			0.69	49.56		
0.7649	0.7712		0.7681	0.50	0.44	0.47		154*	
0.8050	0.7110		0.7585	0.53	0.51	0.52		426	
			0.7633			0.50	47.57		
0.7105	0.7481		0.7293	0.48	0.44	0.46	45.45	447	
0.7506	0.7400		0.7453	0.72	1.22	0.97	46.45	759	
0.7524	0.7608		0.7611	0.71	0.67	0.69		209	
0.6716	0.6700		0.6708	0.60	0.63	0.62		614	
			0.7159			0.66	44.61		
0.6625	0.6503		0.6564	0.57	0.56	0.57	40.91	239	
0.7724	0.7620		0.7672	0.82	0.94	0.88		301	
0.8172	0.7718		0.7945	0.65	0.73	0.69		569	
			0.7800			0.79	48.67		
0.7770	0.7596		0.7683	0.91	0.91	0.91	47.88	767	
0.9010	0.9042		0.9326	0.62	0.46	0.54	58.18	1164	
0.6074	0.7642		0.6858	0.61	0.64	0.63		156	
0.7904	0.7944		0.7924	0.42	0.53	0.48		241	
0.8600	0.9028	0.8570	0.8733	0.65	0.45	0.53		849	
			0.7838			0.55	48.85		
0.7067	0.7393		0.7342	0.43	0.44	0.44		867	
0.7081	0.7826								
0.6602	0.7823		0.7126	0.27	0.33	0.30		875	
0.7028	0.6985								
0.6099			0.6099	0.32	0.39	0.36		1259	
			0.6856			0.37	42.72		
0.6415	0.6170		0.6295	0.47	0.40	0.43		546	
0.5773	0.5665		0.5719	0.48	0.73	0.61		1095	
0.5841	0.5901		0.5916	0.29	0.34	0.32		1173	
0.5605	0.5549	0.5692	0.5615	0.67	0.66	0.67	All sap-wood	1181	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
139. Liquidambar styraciflua—continued . . .	1182	Mississippi . . . . .	Yazoo River bottom	R. Abbey . . . . .	Alluvial . . . . .			
	1183	do . . . . .	do . . . . .	do . . . . .	do . . . . .			
RHIZOPHORACEÆ.								
140. Rhizophora Mangle. . . . . <i>Mangrove.</i>	485	Florida . . . . .	Bay Biscayne . . . . .	A. H. Curtiss . . . . .	Salt-marsh . . . . .	0.250	81	50
COMBRETACEÆ.								
141. Conocarpus erecta. . . . . <i>Button Wood.</i>	489	do . . . . .	do . . . . .	do . . . . .	do . . . . .	0.164	15	34
142. Laguncularia racemosa. . . . . <i>White Button Wood. White Mangrove.</i>	507	do . . . . .	Sugar-leaf Sound	do . . . . .	do . . . . .			
MYRTACEÆ.								
143. Calyptranthes Chytraculia . . . . .	1205	do . . . . .	Key Largo . . . . .	do . . . . .	Coral . . . . .			
144. Eugenia buxifolia . . . . . <i>Gurgeon Stopper. Spanish Stopper.</i>	456	do . . . . .	Upper Metacombe Key . . . . .	do . . . . .	do . . . . .	0.084	43	
	1118	do . . . . .	Lost Man's river . . . . .	do . . . . .	Humus and coral . . . . .			
	1120	do . . . . .	Elliott's Key . . . . .	do . . . . .	Coral . . . . .			
	1198	do . . . . .	Upper Metacombe Key . . . . .	do . . . . .	do . . . . .			
145. Eugenia dichotoma . . . . . <i>Naked Wood.</i>	566	do . . . . .	Caximbas pass . . . . .	do . . . . .	Sandy . . . . .	0.084	5	53
	1200	do . . . . .	Palm Hummock . . . . .	do . . . . .	Coral . . . . .			
146. Eugenia monticola . . . . . <i>Stopper. White Stopper.</i>	1115	do . . . . .	Umbrella Key . . . . .	do . . . . .	do . . . . .	0.150	15	
	1136	do . . . . .	do . . . . .	do . . . . .	do . . . . .			
	1189	do . . . . .	do . . . . .	do . . . . .	do . . . . .			
147. Eugenia longipes . . . . . <i>Stopper.</i>	1137	do . . . . .	No-Name Key . . . . .	do . . . . .	do . . . . .			
148. Eugenia procera . . . . . <i>Red Stopper.</i>	1127	do . . . . .	Miami . . . . .	do . . . . .	do . . . . .	0.141	87	
CACTACEÆ.								
149. Cereus giganteus . . . . . <i>Suwarrou. Saguaro. Giant Cactus.</i>	693	Arizona . . . . .	Tucson . . . . .	G. Engelmann and C. S. Sargent.	Dry, gravelly . . . . .			
CORNACEÆ.								
150. Cornus alternifolia . . . . . <i>Dogwood.</i>	860	Massachusetts . . . . .	Danvers . . . . .	J. Robinson . . . . .	Loam . . . . .			
	861	do . . . . .	do . . . . .	do . . . . .	do . . . . .			
151. Cornus florida . . . . . <i>Flowering Dogwood. Box Wood.</i>	67	Missouri . . . . .	Allenton . . . . .	G. W. Letterman . . . . .	Uplands . . . . .	0.143	47	
	761	Florida . . . . .	Chattahoochee . . . . .	A. H. Curtiss . . . . .	Calcareous . . . . .	0.128	72	
	812	West Virginia . . . . .	Grafton . . . . .	C. G. Pringle . . . . .	Dry . . . . .			
	1077	Missouri . . . . .	Allenton . . . . .	G. W. Letterman . . . . .	Gravelly . . . . .	0.122	44	7
	1093	do . . . . .	do . . . . .	do . . . . .	Flinty . . . . .			
152. Cornus Nuttallii . . . . . <i>Flowering Dogwood.</i>	900	Oregon . . . . .	Portland . . . . .	G. Engelmann and C. S. Sargent.				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.6125	0.5801	0.0256	0.6091	0.72	0.77	0.75		1182	
0.5825	0.5705	0.5878	0.5823	0.85	0.77	0.81		1183	
			0.5910			0.61	36.88		
1.1891	1.1842		1.1617	1.80	1.83	1.82	72.40	485	
0.9939	0.9800		0.9900	0.32	0.32	0.32	61.70	480	
0.7100	0.7174		0.7137	1.60	1.54	1.62	44.48	507	
0.8090	0.9282	0.8765	0.8992	3.04	3.59	3.32	56.04	1205	
0.8753			0.8753	1.11	1.26	1.19		456	
1.0625	1.0400		1.0513	1.19	1.05	1.12		1118	
0.8045	0.8540	1.0200	0.9128	2.23	2.15	2.19		1120	
0.8857	0.9232		0.9045	1.06	1.38	1.52		1198	
			0.9360			1.50	58.33		
0.8526	0.8392		0.8459	0.85	0.91	0.88		566	
0.9542	0.9472		0.9507	0.58	0.60	0.59		1200	
			0.8983			0.74	55.98		
0.8910	0.9110		0.9010	2.05	1.95	2.00		1115	
0.9180	0.9040	0.9202	0.9241	1.00	1.95	1.77		1135	
0.9140	0.9205		0.9217	1.88	1.99	1.91		1189	
			0.9156			1.89	57.06		
1.1450	1.1020		1.1235	3.30	3.00	3.48	70.02	1197	
0.9425	0.9482		0.9453	2.44	2.79	2.62	58.91	1127	
0.8250	0.8110		0.8188	3.89	3.01	3.45	19.87	693	
0.0572	0.0748	0.6048	0.0456	0.43	0.41	0.42		860	
0.6087	0.6932	0.6898	0.6037	0.39	0.43	0.41		861	
			0.6696			0.41	41.73		
0.8204	0.8204		0.8204	0.51	0.60	0.56		67	
0.7509	0.7710		0.7655	0.75	0.84	0.80		761	
0.7892	0.7668		0.7878	0.73	0.83	0.78		812	
0.8000	0.8916		0.8803	0.66	0.58	0.62		1077	
0.8114	0.8215		0.8165	0.62	0.60	0.61		1092	
			0.8153			0.67	50.81		
0.7487	0.7474		0.7481	0.48	0.52	0.50	46.62	860	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
153. <i>Nyssa capitata</i> ..... <i>Ogeechee Lime. Sour Tupelo. Gopher Plum.</i>	605	Georgia.....	Ogeechee river .....	A. H. Curtiss.....	Swampy .....	0.220	27	
154. <i>Nyssa sylvatica</i> ..... <i>Tupelo. Sour Gum. Pepperidge. Black Gum.</i>	235	South Carolina.....	Bonneau's Depot ...	H. W. Ravenel .....	Muck.....			
	517	Tennessee .....	Cumberland river...	A. Gattinger .....				
	608	Georgia .....	Ogeechee river.....	A. H. Curtiss.....	Muck.....	0.220	40	
	750	Florida .....	Chattahoochee.....	do .....	Clay .....	0.214	40	
	813	West Virginia.....	Grafton.....	C. G. Pringle .....				
	833	Massachusetts.....	West Newbury.....	J. Robinson .....	Rich.....	0.256	66	32
	834	do .....	do .....	do .....	do .....			
	835	do .....	Chebacco pond .....	do .....	Low, rich .....			
155. <i>Nyssa uniflora</i> ..... <i>Large Tupelo. Cotton Gum. Tupelo Gum.</i>	128	South Carolina .....	Bonneau's Depot ...	H. W. Ravenel .....	Swampy .....			
	285	do .....	do .....	do .....		0.188	30	
	550	Alabama .....	Stockton.....	C. Mohr .....	Alluvial .....	0.320	67	10
	604	Georgia .....	Ogeechee river.....	A. H. Curtiss.....	Swampy .....			
CAPRIFOLIACEÆ.								
156. <i>Sambucus glauca</i> ..... <i>Elder.</i>	581	California .....	Contra Costa county.	G. R. Vasey .....	Gravelly.....	0.320	6	28
157. <i>Sambucus Mexicana</i> ..... <i>Elder.</i>	1220	Arizona .....	Santa Catalina mountains.	C. G. Pringle .....				
158. <i>Viburnum Lentago</i> ..... <i>Sheepberry. Nannyberry.</i>	108	Vermont.....	Charlotte .....	do .....	Muck.....			
	370	do .....	Hinesburg.....	do .....	Swampy .....			
159. <i>Viburnum prunifolium</i> ..... <i>Black Haw. Stag Bush.</i>	42	Kentucky .....	Mercer county.....	W. M. Linney .....	Shale .....			
	1104	do .....	do .....	do .....	Trenton limestone.			
	730	Georgia .....	Bainbridge .....	A. H. Curtiss.....	Clay .....	0.076	30	
RUBIACEÆ.								
160. <i>Exostemma Caribæum</i> .....	466	Florida .....	Upper Metacombe Key.	do .....	Coral .....	0.076	28	25
161. <i>Pinckneya pubens</i> ..... <i>Georgia Bark.</i>	257	South Carolina.....	Bluffton .....	J. H. Mellichamp...	Sandy, swamp .....	0.108	5	34
	381	do .....	do .....	do .....	do .....			
162. <i>Genipa clusiafolia</i> ..... <i>Seven-year Apple.</i>	457	Florida .....	Upper Metacombe Key.	A. H. Curtiss.....	Sandy .....			
	1132	do .....	Elliott's Key .....	do .....	Coral .....			
	1105	do .....	Upper Metacombe Key.	do .....	do .....			
163. <i>Guettarda elliptica</i> .....	471	do .....	do .....	do .....	do .....	0.095	34	
	1120	do .....	Umbrella Key .....	do .....	do .....			
	1194	do .....	do .....	do .....	do .....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4680	0.4546	.....	0.4613	0.85	0.83	0.84	28.75	.....	605
0.5656	0.5640	.....	0.5652	0.66	0.81	0.74	.....	.....	235
0.5650	.....	.....	0.5650	0.89	0.79	0.84	.....	.....	517
0.6079	0.6104	.....	0.6092	0.49	0.43	0.46	.....	N. Caroliniana.	608
0.6436	0.6682	.....	0.6559	0.49	0.49	0.49	.....	.....	750
0.6198	0.5865	.....	0.6031	0.52	0.53	0.53	.....	.....	813
0.6849	0.6787	0.6881	0.6839	0.41	0.40	0.41	.....	.....	633
0.7467	0.6748	0.6708	0.6974	0.88	0.89	0.88	.....	.....	834
0.7429	0.6626	0.7022	0.7026	0.82	0.84	0.83	.....	.....	835
			0.6353			0.52	39.59	.....	
0.5589	0.5700	.....	0.5645	0.72	0.76	0.74	.....	.....	123
0.5656	0.5649	.....	0.5653	0.66	0.81	0.74	.....	.....	235
0.5002	0.5525	.....	0.5264	0.58	0.59	0.59	.....	.....	550
0.4424	0.4002	.....	0.4213	0.76	0.66	0.71	.....	.....	604
			0.5194			0.70	32.37	.....	
0.5076	0.5098	.....	0.5087	1.60	1.55	1.57	31.70	.....	681
0.4688	0.4608	0.4586	0.4614	1.83	2.17	2.00	28.75	.....	1220
0.7285	0.7075	.....	0.7180	0.27	0.28	0.28	.....	0.1 sap-wood	108
0.7519	0.7392	.....	0.7426	0.29	0.30	0.30	.....	.....	870
			0.7303			0.20	45.51	.....	
0.8106	.....	.....	0.8106	0.46	0.49	0.48	.....	0.75 sap-wood	43
0.9140	.....	.....	0.9140	0.47	.....	0.47	.....	All sap-wood	1104
0.7749	.....	.....	0.7749	0.60	.....	0.60	.....	All sap-wood	739
			0.8332			0.52	51.92	.....	
0.9200	0.9419	.....	0.9310	0.24	0.23	0.23	53.02	.....	406
0.5528	0.5613	.....	0.5571	0.28	0.27	0.28	.....	.....	257
0.5126	0.5181	.....	0.5129	0.49	0.58	0.54	.....	.....	381
			0.5850			0.41	33.41	.....	
1.0219	.....	.....	1.0219	0.71	0.60	0.66	.....	All sap-wood	457
1.0425	1.0270	0.9175	0.9957	1.00	1.02	1.01	.....	Second and third sp. gr. determinations made on 0.2 sap-wood	1132
1.0765	1.0840	.....	1.0772	1.48	1.55	1.52	.....	.....	1105
			1.0316			1.06	64.29	.....	
0.9375	0.8923	.....	0.9154	0.88	0.79	0.84	.....	.....	471
0.8409	0.8598	.....	0.8504	0.94	1.03	0.99	.....	.....	1129
0.7499	0.7217	.....	0.7353	1.33	1.32	1.32	.....	.....	1194
			0.8337			1.05	51.96	.....	

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
ERICACEÆ								
164. <i>Vaccinium arboreum</i> <i>Furkberry.</i>	348	Alabama	Citronelle	C. Mohr	Sandy	0.127	65	
	612	Georgia	Altamaha river	A. H. Curtiss	Swampy			
165. <i>Andromeda ferruginea</i>	1088	Florida	Jacksonville	do	Hummock			
	1084	do	do	do		0.216	5	20
166. <i>Arbutus Menziesii</i> <i>Madroña.</i>	648	California	Contra Costa county	G. R. Vasey	Gravelly			
	679	do	Marin county	do	do			
167. <i>Arbutus Xalapensis</i>	596	Arizona	Santa Rita mountains	G. Engelmann and C. S. Sargent.	Rocky			
168. <i>Arbutus Texana</i>	1085	Texas	Hays county	S. B. Buckley	Limestone	0.086	22	26
169. <i>Oxydendrum arboreum</i> <i>Sorrel Tree. Sour Wood.</i>	858	Alabama	Cottage Hill	C. Mohr	Light, rich	0.130	28	
	515	Tennessee	Nashville	A. Gattinger	Sandy, rocky			
170. <i>Kalmia latifolia</i> <i>Laurel. Calico Bush. Spoon Wood. Ivy.</i>	262 <sup>1</sup>	Virginia	Fancy Gap	H. Shriver	Moist	0.082	74	
	262 <sup>2</sup>	do	do	do	do			
	262 <sup>3</sup>	do	do	do	do			
171. <i>Rhododendron maximum</i> <i>Great Laurel. Rose Bay.</i>	263 <sup>1</sup>	do	do	do	do	0.078	52	
	263 <sup>2</sup>	do	do	do	do			
MYRSINACEÆ								
172. <i>Myrsine Rapanca</i>	1128	Florida	Bay Biscayne	A. H. Curtiss	Coral			
173. <i>Ardisia Pickeringia</i> <i>Marlberry. Cherry.</i>	494	do	do	do	do	0.080	15	18
	1186	do	do	do	do			
	1192	do	Palm creek	do	do			
174. <i>Jacquinia armillaris</i> <i>Joe Wood.</i>	498	do	Key Largo	do	do			
	1180	do	Elliott's Key	do	do			
	1199	do	Umbrella Key	do	do			
SAPOTACEÆ								
175. <i>Chrysophyllum oliviforme</i>	492	do	Bay Biscayne	do	do	0.105	18	
176. <i>Sideroxylon Mastichodendron</i> <i>Mastic.</i>	461	do	Upper Metacombe Key	do	do	0.266	29	49

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7814	0.7479	.....	0.7647	0.42	0.45	0.44	.....	343	
0.7740	0.7405	.....	0.7573	0.35	0.32	0.34	.....	612	
			0.7610			0.39	47.42		
0.7766	0.8021	.....	0.7894	0.45	0.87	0.41	.....	1033	
0.7637	0.7174	.....	0.7106	0.56	0.45	0.51	.....	1034	
			0.7500			0.46	46.74		
0.6452	0.6939	.....	0.6696	0.42	0.33	0.38	.....	643	
0.7482	0.7332	.....	0.7407	0.42	0.39	0.41	.....	679	
			0.7052			0.40	43.95		
{ 0.7202	{ 0.6955	.....	0.7099	{ 0.21	0.24	0.25	.....	596	
{ 0.6842	{ 0.7397	.....							{ 0.30
0.7585	0.7074	0.7202	0.7500	0.54	0.48	0.51	46.74	0.5 sap-wood.....	1085
0.7920	0.7574	0.7916	0.7803	0.42	0.49	0.46	.....	353	
0.7114			0.7114	0.27	0.31	0.29	.....	515	
			0.7458			0.37	46.48		
0.7596			0.7536	0.61		0.61	.....	262 <sup>1</sup>	
0.7214			0.7214	0.31		0.31	.....	262 <sup>2</sup>	
0.6780			0.6730	0.32		0.32	.....	262 <sup>3</sup>	
			0.7160			0.41	44.62		
0.6200			0.6200	0.43		0.43	.....	263 <sup>1</sup>	
0.6841			0.6841	0.29		0.29	.....	263 <sup>2</sup>	
			0.6303			0.36	39.28		
0.8491	0.8541	0.7990	0.8341	0.74	0.88	0.81	51.98	1123	
0.8154	0.8412	.....	0.8283	1.81	1.84	1.83	.....	494	
0.8800	0.8532	.....	0.8666	1.74	1.95	1.85	.....	1136	
0.8770	0.8942	.....	0.8856	1.75	1.95	1.85	.....	1192	
			0.8602			1.85	53.61		
0.5698	0.6500	0.6582	0.6258	4.09	3.82	3.96	.....	498	
0.6437	0.6475	.....	0.6456	3.47	3.74	3.61	.....	1130	
0.8300	0.7965	.....	0.8132	2.85	2.73	2.79	.....	1199	
			0.6948			3.45	43.30		
0.8986	0.9433	0.9960	0.9360	1.36	1.11	1.24	53.33	492	
1 0125	1.0149	1.0052	1.0109	4.90	5.37	5.14	63.00	461	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
177. <i>Dipholis salicifolia</i> <i>Bustic. Casada.</i>	488	Florida	Bay Biscayne	A. H. Curtiss	Coral	0.170	36	14
	500	do	Umbrella Key	do	do	0.150	7	25
	1191	do	No-Name Key	do	do			
178. <i>Bumelia tenax</i>	746	Georgia	Bainbridge	do	Low	0.128	29	
179. <i>Bumelia lanuginosa</i> <i>Gum Elastic. Shittim Wood.</i>	60	Missouri	Allenton	G. W. Letterman	Limestone	0.286	57	
	930	Texas	Austin	C. Mohr	do	0.237	65	
	1083	Missouri	Allenton	G. W. Letterman	do			
180. <i>Bumelia spinosa</i>	1146	Arizona	Santa Catalina mountains.	C. G. Pringle	Rocky			
	1151	do	do	do	do			
181. <i>Bumelia lyoloides</i> <i>Iron Wood. Southern Buckthorn.</i>	333	Tennessee	Nashville	A. Gattinger	Alluvial			
182. <i>Bumelia cuneata</i> <i>Ant's Wood. Downward Plum. Saffron Plum.</i>	503	Florida	Long Key	A. H. Curtiss	Coral			
	1124	do	Boca Chica Key	do	do			
183. <i>Mimusops Sieberi</i> <i>Wild Dilly.</i>	458	do	Upper Metacombe Key.	do	do	0.170	12	40
EBENACEÆ.								
184. <i>Diospyros Virginiana</i> <i>Persimmon.</i>	61	Missouri	Allenton	G. W. Letterman	Rich upland	0.158	56	
	425	Tennessee	Nashville	A. Gattinger	Rich loam			
	811	West Virginia	Grafton	C. G. Pringle				
	1084	Missouri	Allenton	G. W. Letterman	Rich upland			
1162	do	do	do	do				
185. <i>Diospyros Texana</i> <i>Black Persimmon. Mexican Persimmon. Chapote.</i>	936	Texas	Austin	C. Mohr	Calcareous	0.098	37	
STYRACACEÆ.								
186. <i>Symplocos tinctoria</i> <i>Horse Sugar. Sweet Leaf.</i>	347	Alabama	Cottage Hill	do	Sandy	0.134	26	
	560	Arkansas	Texarkana	G. W. Letterman	do	0.123	47	
187. <i>Halesia diptera</i> <i>Snow-drop Tree. Sweet-bell Tree.</i>	738	Georgia	Bainbridge	A. H. Curtiss	Low			
	922	Florida	Apalachicola	C. Mohr	Alluvial			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.0813	0.8887		0.9850	0.34	0.32	0.33		433	
0.9737	0.9233		0.9485	0.26	0.31	0.29		509	
0.9312	0.8912		0.9112	0.37	0.33	0.35		1104	
			0.9316			0.32	58.06		
0.7103	0.7479		0.7293	0.71	0.84	0.78	45.45	748	
0.7541	0.7209		0.7420	1.10	1.02	1.06		66	
0.5947	0.5997	0.5777	0.5907	1.44	1.28	1.36		936	
0.6221	0.6386		0.6304	1.27	1.27	1.27		1084	
			0.6544			1.23	40.78		
0.6580	0.6991		0.6736	1.19	1.04	1.11		1146	
0.6392	0.6003		0.6419	1.32	1.43	1.37		1151	
0.6565	0.6658		0.6603			1.24	41.15		
0.7467			0.7467	0.81	0.81	0.81	46.53	338	
0.7567	0.7465		0.7516	2.29	2.31	2.30		503	
0.8420	0.8384		0.8402	1.60	1.43	1.51		1124	
			0.7959			1.90	49.60		
1.0525	1.0989	1.1000	1.0838	2.89	2.32	2.61	67.54	454	
0.7039	0.7465		0.7552	1.03	1.03	1.03		61	
0.8552			0.8552	0.95	1.12	1.04		425	
0.7982	0.7884		0.7913	0.83	0.70	0.77		811	
0.7790	0.7920		0.7855	0.86	1.02	0.94		1084	
0.7710	0.7722	0.7870	0.7837	0.97	1.05	1.01		1162	
			0.7908			0.96	49.28		
0.8325	0.8391	0.8604	0.8460	3.34	3.32	3.33	52.72	936	
0.5265	0.5593		0.5429	0.72	0.81	0.77		347	
0.5079	0.5360		0.5220	0.62	0.57	0.60		569	
			0.5325			0.68	33.13		
0.5481	0.5381		0.5431	0.57	0.42	0.50		733	
0.5999	0.5957		0.5978	0.35	0.35	0.35		922	
			0.5705			0.42	35.55		

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
188. <i>Halesia tetraptera</i> ..... <i>Rattlebox. Snow-drop Tree. Silver-bell Tree. Calico Wood.</i>	275	Virginia	Carter's ferry.....	H. Shriver.....	Rocky.....	0.088	17	
	618	Georgia	Altamaha river.....	A. H. Curtis.....	Clay.....			
OLEACEÆ.								
189. <i>Fraxinus Greggii</i> .....	1221	Mexico	Lampasas mount- ains.	S. B. Buckley.....				
190. <i>Fraxinus anomala</i> .....	1105	Utah	Kane county.....	A. L. Siler.....	Sandy.....			
191. <i>Fraxinus pistaciifolia</i> ..... <i>Ash.</i>	591	Arizona	Santa Rita mount- ains.	G. Engelmann and C. S. Sargent.	Low.....			
	892	Eastern Arizona	San Franciscomount- ains.	E. L. Greene.....				
192. <i>Fraxinus Americana</i> ..... <i>White Ash.</i>	25	Massachusetts	Acushnet.....	E. A. Dana.....				
	391	Missouri	Allenton.....	G. W. Letterman.....	Siliceous hills.....			
	392	do	do	do	Alluvial.....			
	393	do	do	do	do			
	1141	Michigan	Dansville.....	W. J. Beal.....	Clay.....			
	1143	do	Hudson.....	do				
	1144	do	Lansing.....	do				
	1145	do	Dansville.....	do	Clay.....			
	130	South Carolina	Bonneau's Depot.....	H. W. Ravenel.....	Wet.....			
	144	Illinois	Waukegan.....	Robert Douglas.....	Clay.....			
	170	Ohio	Pineo, Daniels & Co.	E. E. Barney.....				
	173	do	Farmers' Friend Manufacturing Co.	do				
	175	do	J. W. Stoddard & Co.	do				
	190	do	Woodsum Machine Co.	do				
	191	do	B. E. McSherry & Co.	do				
	212	Virginia	Wytheville.....	H. Shriver.....				
	2271	Vermont	Charlotte.....	C. G. Pringle.....	Gravelly.....			
	2273	do	do	do	Swampy.....			
	2671	Virginia	Wytheville.....	H. Shriver.....				
	2672	do	do	do				
	2673	do	do	do				
	431	Tennessee	Nashville.....	A. Gattinger.....	Limestone.....			
551	Alabama	Kemper's mill.....	C. Mohr.....	Alluvial.....	0.268	70		
728	Pennsylvania	Williamsport.....	C. G. Pringle.....					
747	Georgia	Bainbridge.....	A. H. Curtiss.....	River-bottom.....	0.260	95		
1045	Massachusetts	Reading.....	J. Robinson.....		0.215	64		
192. <i>Fraxinus Americana, var. Texensis</i> .....	364	Texas	Dallas.....	J. Reverchon.....	Dry, calcareous.....	0.384	69	
	937	do	Austin.....	C. Mohr.....	Rich, calcareous.....			
193. <i>Fraxinus pubescens</i> ..... <i>Red Ash.</i>	189	Michigan	Lansing.....	W. J. Beal.....	Poor.....			
	2291	Vermont	Charlotte.....	C. G. Pringle.....	Clay.....			
	2292	do	do	do	do			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5017	0.5460		0.5530	0.38	0.36	0.37		275	
0.5500	0.5804		0.5717	0.48	0.38	0.43		613	
			0.5628			0.40	35.07		
0.7778	0.8080		0.7904	0.97	0.89	0.93	49.26	1221	
0.6708	0.6485		0.6597	0.81	0.88	0.85	41.11	Growth slow..... 1105	
0.6886	0.6243	}	0.6625	0.84	0.88	0.71		501	
0.7267	0.6656			0.44	0.69				
0.6868	0.7120		0.6994	0.51	0.54	0.53		892	
			0.6810			0.62	42.43		
0.5011	0.6082		0.6297	0.20	0.32	0.31		25	
0.6253	0.6481		0.6367	0.33	0.34	0.34		Wood from hills not considered valuable..... 39 <sup>a</sup>	
0.6223			0.6223	0.51		0.51		All sap-wood..... 39 <sup>b</sup>	
0.6771			0.6771					39 <sup>c</sup>	
0.5205	0.4711		0.4988	0.53		0.53		114 <sup>1</sup>	
0.7225			0.7225	0.60		0.60		114 <sup>2</sup>	
0.6506			0.6506	0.38		0.38		114 <sup>3</sup>	
0.6086			0.6086	0.32		0.32		114 <sup>4</sup>	
0.6744	0.7005		0.6875	0.36	0.30	0.33		All sap-wood..... 130	
0.7631	0.7600		0.7616	0.45	0.45	0.45		All sap-wood; second growth. Growth rapid..... 144	
0.7449			0.7449	0.35	0.37	0.36		170	
0.7179	0.7116		0.7148	0.39	0.39	0.39		173	
0.6470	0.6473		0.6472	0.31	0.29	0.30		175	
0.6383	0.6387		0.6385					190	
0.6116			0.6116	0.24	0.24	0.24		191	
0.6157	0.6213		0.6185	0.45	0.42	0.44		0.5 sap-wood..... 213	
0.6268	0.6320		0.6290	0.30		0.30		227 <sup>a</sup>	
0.6480	0.6987		0.6738	0.20		0.20		227 <sup>b</sup>	
0.6097			0.6097	0.43		0.43		0.5 sap-wood..... 267 <sup>a</sup>	
0.6320			0.6320	0.35		0.35		0.5 sap-wood..... 267 <sup>b</sup>	
0.6703			0.6703	0.44		0.44		All sap-wood..... 267 <sup>c</sup>	
0.6449			0.6449	0.74	0.69	0.72		431	
0.6170	0.6481		0.6320	0.55	0.43	0.52		551	
0.6423	0.5944		0.6184	0.37	0.28	0.33		728	
0.5500	0.5972		0.5786	0.68	0.71	0.70		747	
0.9131	0.8141	0.8016	0.8429	0.47	0.39	0.43		1045	
			0.6543			0.42	40.77		
0.8252	0.8530		0.8391	0.56	0.49	0.53		864	
0.7095	0.6607		0.6881	0.86	0.87	0.87		937	
			0.7636			0.70	47.59		
0.5066	0.6529	0.6770	0.6125	0.26		0.26		Poor quality..... 139	
0.6019			0.6619	0.21		0.21		229 <sup>a</sup>	
0.6455			0.6455	0.22		0.22		229 <sup>b</sup>	

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
193. <i>Fraxinus pubescens</i> —continued.....	229 <sup>a</sup>	Vermont.....	Charlotte.....	C. G. Pringle.....	Clay.....			
	1059	Massachusetts.....	Topsfield.....	J. Robinson.....	River-bottom.....			
194. <i>Fraxinus viridis</i> ..... <i>Green Ash.</i>	57	Missouri.....	Allenton.....	G. W. Letterman.....	Rich, wet.....			
	308	Texas.....	Dallas.....	J. Reverchon.....	do.....	0.512	45	43
	438	Tennessee.....	Nashville.....	A. Gattinger.....	Rich upland.....			
	948	Texas.....	Victoria.....	C. Mohr.....	Rich, wet.....	0.144	31	
	957	do.....	Matagorda bay.....	do.....	do.....	0.184	34	
194. <i>Fraxinus viridis</i> , var. <i>Berlandieriana</i> ..... <i>Ash.</i>	1211	do.....	Austin.....	S. B. Buckley.....	do.....			
195. <i>Fraxinus platycarpa</i> ..... <i>Water Ash.</i>	536	Alabama.....	Stockton.....	C. Mohr.....	Rich, alluvial.....	0.090	27	
196. <i>Fraxinus quadrangulata</i> ..... <i>Blue Ash.</i>	60	Missouri.....	Allenton.....	G. W. Letterman.....	Dry upland.....	0.138	35	
	125	Michigan.....	Lansing.....	W. J. Beal.....	Rich loam.....			
	286 <sup>a</sup>	Kentucky.....	Mercer county.....	W. M. Linney.....	Limestone.....			
	286 <sup>a</sup>	do.....	do.....	do.....	do.....			
	286 <sup>a</sup>	do.....	do.....	do.....	do.....			
	291	Missouri.....	Allenton.....	G. W. Letterman.....	Sandy loam.....			
	423	do.....	do.....	do.....	Rich upland.....			
	518	Tennessee.....	Nashville.....	A. Gattinger.....	Rich limestone.....			
197. <i>Fraxinus Oregana</i> ..... <i>Oregon Ash.</i>	964	Oregon.....	Portland.....	G. Engelmann and C. S. Sargent.....	Low, wet.....	0.355	46	47
	1001	do.....	Weidler's saw-mill.....	do.....				
	1024	do.....	Portland Furniture Company.....	do.....				
	1030	do.....	do.....	do.....				
198. <i>Fraxinus sambucifolia</i> ..... <i>Black Ash. Hoop Ash. Ground Ash.</i>	102	Vermont.....	Charlotte.....	C. G. Pringle.....	Wet, peaty.....			
	122	Michigan.....	Dansville.....	W. J. Beal.....	do.....			
	147	Illinois.....	Waukegan.....	Robert Douglas.....	Low, wet.....			
	378	Vermont.....	Charlotte.....	C. G. Pringle.....	Wet, peaty.....			
	839	Massachusetts.....	Danvers.....	J. Robinson.....	Rich, loamy.....	0.286	55	
199. <i>Forestiera acuminata</i> ..... <i>Privet.</i>	616	Georgia.....	Ogeechee river.....	A. H. Curtiss.....	Rich, moist.....	0.075	31	
	737	do.....	Bainbridge.....	do.....		0.150	55	
	955	Texas.....	Matagorda bay.....	C. Mohr.....	Alluvial.....			
200. <i>Chionanthus Virginia</i> ..... <i>Frings Tree. Old Man's Beard.</i>	276	Virginia.....	Carter's ferry.....	H. Shriver.....	Rich, moist.....			
	751	Florida.....	Chattahoochee.....	A. H. Curtiss.....	Clay upland.....	0.141	47	

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Thrd.	Average.	First.	Second.	Average.			
0.0450			0.0450	0.20		0.20			220 <sup>s</sup>
0.5057	0.5200		0.5508	0.42	0.41	0.42		All sap-wood.	1059
0.5085	0.5489								
			0.0251			0.26	88.90		
0.0040	0.0701		0.0071	0.47	0.02	0.55		First sp. gr. determination made on 0.5 sap-wood.	57
0.5947	0.0277		0.0112	0.54	0.57	0.56			808
0.7350			0.7350	0.82	0.80	0.81		All sap-wood.	438
0.7728	0.8217	0.7002	0.7949	0.03	0.50	0.60		Second and third sp. gr. determinations made on sap-wood.	948
0.7198	0.7807		0.7508	0.82	0.76	0.70		Second sp. gr. determination made on sap-wood.	957
			0.7117			0.05	44.85		
0.5774	0.5780		0.5780	0.51	0.50	0.54	86.02		1211
0.8507	0.8515		0.8511	0.09	0.70	0.78	22.07		586
0.8240	0.8440		0.8340	0.03	0.07	0.05			00
0.4020			0.4020	0.00		0.00			125
0.7780			0.7780	0.74		0.74			286 <sup>t</sup>
0.8181			0.8181	0.81		0.81		Second growth	286 <sup>s</sup>
0.7400			0.7400	0.82		0.82		Second growth	286 <sup>s</sup>
0.5007	0.0080		0.0027	0.88	0.00	0.60			201
0.0807	0.0740		0.0822	0.78	0.74	0.76			423
0.7000			0.7000	0.00	0.01	0.01			616
			0.7184			0.78	46.78		
0.0482	0.5047		0.0180	0.11	0.43	0.27		Second sp. gr. determination made on sap-wood.	904
0.5314	0.0120		0.5710	0.78		0.78			1001
0.4853	0.4780		0.4645	0.12	0.15	0.14		Brush	1024
0.0817	0.0420		0.0371	0.21	0.24	0.23		Tough	1080
			0.5791			0.84	85.72		
0.0200	0.0088		0.0274	0.02	0.07	0.00			102
0.5084			0.5084	0.89		0.89			122
0.0859	0.0812		0.0836	0.84	0.88	0.86		Second sp. gr. determination made on 0.125 sap-wood.	147
0.0485	0.5028		0.0207	0.77	0.83	0.80			378
0.7020	0.7485		0.7243	0.40	0.48	0.47		All sap-wood.	839
			0.0816			0.72	89.97		
0.7007	0.7500		0.7284	0.75	0.72	0.74			610
0.5820	0.5081		0.5755	0.05	0.72	0.69			737
0.5088	0.0002		0.5005	0.88	0.00	0.74			955
			0.0045			0.72	80.54		
0.0470	0.4028		0.5552	0.53		0.53			276
0.7150	0.7105	0.7250	0.7191	0.39	0.50	0.48			751
			0.0872			0.51	89.71		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
201. <i>Osmanthus Americanus</i> ..... <i>Devil Wood.</i>	283	Louisiana.....	Amite.....	C. Mohr.....	Rich, alluvial.....			
	344	Alabama.....	Cottage Hill.....	do.....	Low, rich.....			
	584	Florida.....	Saint John's river ..	A. H. Curtiss.....	Sandy loam.....	0. 190	45	19
BORRAGINACEÆ.								
202. <i>Cordia Sebestena</i> ..... <i>Geiger Tree.</i>	1202	do.....	Key West.....	do.....	Coral.....			
	1218	do.....	do.....	do.....	do.....			
203. <i>Cordia Boissieri</i> .....	1223	Texas.....	Brownsville.....	S. B. Buckley.....	Limestone.....			
204. <i>Bourreria Havanaensis</i> ..... <i>Strong Bark.</i>	455	Florida.....	Upper Metacombe Key.....	A. H. Curtiss.....	Coral.....	0. 092	45	
	1137	do.....	Key Largo.....	do.....	do.....			
205. <i>Ehretia elliptica</i> ..... <i>Knackaway. Anagua.</i>	827	Texas.....	.....	Department of Agriculture.....	.....			
	942	do.....	New Braunfels.....	C. Mohr.....	Rich, alluvial.....	0. 170	25	
BIGNONIACEÆ.								
206. <i>Catalpa bignonioides</i> ..... <i>Catalpa. Catawba. Bean Tree. Cigar Tree. Indian Bean.</i>	167	Ohio.....	Alexandersville.....	S. H. Binkley and E. E. Barney.....	Clayey loam.....			
	540	Alabama.....	Stockton.....	C. Mohr.....	Low, wet.....			
	744	Georgia.....	Bainbridge.....	A. H. Curtiss.....	Clay.....	0. 238	8	17
207. <i>Catalpa speciosa</i> ..... <i>Western Catalpa.</i>	38	Missouri.....	Charleston.....	C. S. Sargent.....	Wet clay.....	0. 238	8	51
	160	Ohio.....	Dayton.....	E. E. Barney.....	Clay.....			
	106	Illinois.....	Cairo.....	D. Axtell.....	do.....			
	171	Indiana.....	Wabash river.....	E. E. Barney.....	Low, alluvial bottom.....			
	180	Tennessee.....	Obion river.....	E. P. Hynds and E. E. Barney.....	do.....			
	181	Missouri.....	New Madrid.....	E. E. Barney.....	do.....			
	182	Illinois.....	Ullin.....	do.....	do.....			
	183	Missouri.....	New Madrid.....	do.....	do.....			
	184	do.....	do.....	do.....	do.....			
	210	Indiana.....	Vincennes.....	do.....	do.....			
208. <i>Chilopsis saligna</i> ..... <i>Desert Willow.</i>	556	New Mexico.....	Valley of the Upper Gila river.....	E. L. Greene.....	Alluvial.....			
	595	Arizona.....	Tucson.....	G. Engelmann and C. S. Sargent.....	Moist, gravelly.....			
	682	do.....	do.....	do.....	do.....			
209. <i>Crescentia cucurbitina</i> ..... <i>Black Calabash Tree.</i>	1216	Florida.....	Bay Biscayne.....	A. H. Curtiss.....	Coral.....			
VERBENACEÆ.								
210. <i>Citharexylum villosum</i> ..... <i>Fiddle Wood.</i>	483	do.....	do.....	do.....	do.....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.8156	0.8652		0.8404	0.68	0.65	0.67		0.5 sap-wood	283
0.8606			0.8606	0.26	0.29	0.28		All sap-wood	344
0.7100	0.7544		0.7322	0.43	0.43	0.43		First sp. gr. determination made on sap-wood; second sp. gr. determination made on 0.75 sap-wood.	584
			0.8111			0.46	50.55		
0.7740			0.7740		4.09	4.09			1202
0.6008	0.6942		0.6475	4.43	4.28	4.35			1218
			0.7103			4.22	44.30		
0.6710	0.6870		0.6700	3.67	3.39	3.53	42.31		1223
0.8280	0.8248		0.8264	3.38	3.20	3.29			455
0.7708	0.7960	0.7080	0.7883	2.28	2.27	2.28			1137
			0.8073			2.79	50.31		
0.6636	0.6548		0.6592	1.23	1.27	1.25			827
0.6274	0.6302		0.6288	1.33	1.41	1.37			942
			0.6440			1.31	40.13		
0.4208	0.4270		0.4282	0.40	0.41	0.41		Cultivated	167
0.4094	0.4970		0.4837	0.26	0.34	0.30			540
0.4426	0.4177		0.4302	0.47	0.37	0.42			744
			0.4474			0.38	27.88		
0.4601	0.4446		0.4524	0.30	0.41	0.36			38
0.4586	0.4467		0.4527	0.34	0.39	0.37		Cultivated	160
0.3897	0.3829		0.3863	0.36	0.34	0.35			166
0.3850	0.3878		0.3864	0.32	0.30	0.31			171
0.4156	0.3788	0.4260	0.4066	0.45	0.50	0.48			180
0.3900			0.3900	0.38	0.42	0.40		From an old fence-rail	181
0.3968			0.3968	0.47	0.43	0.45		From a post 47 years in the ground	182
0.4493			0.4493	0.43	0.37	0.43		From a standing tree killed by earthquake in 1812	183
0.4535			0.4535	0.40	0.34	0.37			184
0.3911	0.3907		0.3909	0.38	0.39	0.39			210
			0.4165			0.30	25.96		
0.6059			0.6059	0.37	0.37	0.37			559
0.5631			0.5631	0.43	0.41	0.42			595
0.6003	0.6028		0.6015	0.32	0.32	0.32			682
			0.5902			0.37	36.73		
0.6270	0.6368		0.6319	1.47	1.23	1.35	39.38		1216
0.8775	0.8644		0.8710	0.49	0.54	0.52	54.28		433

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
211. <i>Avicennia nitida</i> ..... <i>Black Mangrove. Black Tree. Black Wood.</i>	490	Florida .....	Bay Biscayne.....	A. H. Curtiss.....	Coral .....	0.158	39	18
	826	do .....	.....	Department of Ag- riculture.	.....			
	828	do .....	.....	do .....	.....			
NYCTAGINACEÆ.								
212. <i>Pisonia obtusata</i> ..... <i>Pigeon Wood. Beef Wood. Cork Wood. Pork Wood.</i>	474	do .....	Upper Metacombe Key.	A. H. Curtiss.....	Coral .....			
POLYGONACEÆ.								
213. <i>Coccoloba floridana</i> ..... <i>Pigeon Plum.</i>	473	do .....	do .....	do .....	do .....	0.156	48	27
214. <i>Coccoloba uvifera</i> ..... <i>Sea Grape.</i>	453	do .....	do .....	do .....	Sandy .....	0.214	17	29
LAURACEÆ.								
215. <i>Persea carolinensis</i> ..... <i>Red Bay.</i>	585	do .....	Saint John's river ..	do .....	Sandy loam .....	0.188	12	45
215. <i>Persea carolinensis, var. palustris</i> .....	340	Alabama.....	Mobile county.....	C. Mohr .....	Damp, sandy .....	0.372	110	
216. <i>Nectandra Willdenoviana</i> ..... <i>Lance Wood.</i>	479	Florida .....	Upper Metacombe Key.	A. H. Curtiss.....	Coral .....			
	1188	do .....	Bay Biscayne.....	do .....	do .....	0.086	27	
	1196	do .....	Upper Metacombe Key.	do .....	do .....			
217. <i>Sassafras officinale</i> ..... <i>Sassafras.</i>	71	Missouri.....	Allenton.....	G. W. Letterman...	Low, rich.....			
	387	do .....	do .....	do .....	Alluvial .....			
	446	Tennessee.....	Nashville.....	A. Gattinger .....	Rich .....			
	814	West Virginia.....	Grafton.....	C. G. Pringle .....	.....			
	854	Massachusetts.....	Danvers.....	J. Robinson.....	Rich loam .....	0.232	11	68
	1163	Missouri.....	Allenton.....	G. W. Letterman...	Low, alluvial .....			
218. <i>Umbellularia Californica</i> ..... <i>Mountain Laurel. California Laurel. Spice Tree. Cagiput. California Olive. California Bay Tree.</i>	703	Oregon .....	Coos bay.....	G. Engelmann and C. S. Sargent.	.....			
	897	California .....	.....	Department of Ag- riculture.	.....			
EUPHORBIACEÆ.								
219. <i>Drypetes crocea</i> ..... <i>Guiana Plum. White Wood.</i>	468	Florida .....	Upper Metacombe Key.	A. H. Curtiss.....	Coral .....			
	1185	do .....	No-Name Key.....	do .....	do .....			
	1193	do .....	Upper Metacombe Key.	do .....	do .....			
219. <i>Drypetes crocea, var. latifolia</i> .....	459	do .....	do .....	do .....	do .....	0.292	112	52
	1187	do .....	do .....	do .....	do .....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
1.0010	1.0485		1.0702	1.00	1.12	1.50		0.5 sap-wood	490
0.0060	1.0622		0.0794	1.71	1.72	1.71		First sp. gr. determination made on sap-wood; second sp. gr. determination made on 0.5 sap-wood.	826
0.7074	0.0702		0.0018	4.54	4.01	4.27		All sap-wood	828
			0.0138			2.51	50.95		
0.6475	0.6582		0.6620	7.44	7.70	7.62	40.00		474
0.0020	1.0040		0.0835	5.25	4.81	5.03	61.20	0.60 sap-wood	478
0.0140	0.0008	0.0750	0.0635	1.11	1.63	1.37	60.04	First sp. gr. determination made on 0.5 sap-wood; third sp. gr. determination made on 0.25 sap-wood.	458
0.0073	0.6485		0.6420	0.66	0.85	0.76	40.07		585
0.5077	0.6815		0.0300	0.40	0.27	0.37	30.80		340
0.8200	0.7050		0.7028	0.83	0.68	0.75		0.0 sap-wood	470
0.7080	0.8482		0.8147	0.52	0.50	0.50		All sap-wood	1188
0.8148	0.7080		0.7005	0.48	0.47	0.48			1106
0.7222	0.0787		0.7003			0.60	47.04		
0.5030	0.5210		0.5120	0.11	0.09	0.10			71
0.4000	0.4828		0.4804	0.08	0.09	0.09			387
0.4542			0.4642	0.04	0.05	0.05			440
0.5200	0.5008		0.5015	0.06	0.07	0.07			814
0.5706		0.5773	0.5700	0.00	0.23	0.15			854
0.4658	0.4010	0.5055	0.4044	0.12	0.15	0.13			1163
			0.5042			0.10	31.42		
0.6220	0.6202		0.6204	0.30	0.27	0.32			703
0.6007	0.6840		0.6780	0.55	0.56	0.40			897
			0.6517			0.30	40.61		
0.0105	0.8448		0.8821	8.58	8.16	8.37		All sap-wood	405
0.8018	0.0110		0.0010	8.10	3.20	8.23			1185
0.0000	0.0882		0.0780	7.07	6.58	6.83			1108
			0.0200			0.14	87.30		
1.0060	0.0000		0.0780	8.00	8.00	8.80			450
0.0048	0.8378		0.8008	7.70	7.70	7.70			1187
			0.0340			8.20	55.24		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
220. <i>Sebastiania lucida</i> ..... <i>Crab Wood. Poison Wood.</i>	469	Florida	Upper Metacombe Key.	A. H. Curtiss	Coral	0.116	30	40
	1126	do	do	do	do			
	1206	do	Key Largo	do	do			
221. <i>Hippomane Mancinella</i> ..... <i>Manchineel.</i>	1110	do	Key West	do	do	0.129	35	
URTICACEÆ.								
222. <i>Ulmus crassifolia</i> ..... <i>Cedar Elm.</i>	324	Texas	Dallas	J. Reverchon	Rich loam	0.484	52	76
	929	do	Austin	C. Mohr	do			
223. <i>Ulmus fulva</i> ..... <i>Red Elm. Slippery Elm. Moose Elm.</i>	30 <sup>1</sup>	Kentucky	Mercer county	W. M. Linney	Limestone			
	30 <sup>2</sup>	do	do	do	do			
	30 <sup>4</sup>	do	do	do	do			
	101	Vermont	Hinesburg	C. G. Pringle	Gravelly loam			
	120	Michigan	Dansville	W. J. Beal	Gravelly			
	134	Missouri	Allenton	G. W. Letterman	Rich, alluvial			
	366	Vermont	Charlotte	C. G. Pringle	Gravelly			
	369	do	do	do	do			
	429	Tennessee	Nashville	A. Gattinger	Clay			
	869	Massachusetts	Boxford	J. Robinson	Rich loam			
224. <i>Ulmus Americana</i> ..... <i>White Elm. American Elm. Water Elm.</i>	19	do	Arnold Arboretum	C. S. Sargent	Drift	0.561	19	38
	202	Ohio	S. M. Brown & Co.	E. E. Barney	Limestone			
	281 <sup>1</sup>	Missouri	Allenton	G. W. Letterman	Alluvial			
	281 <sup>2</sup>	do	do	do	do			
	958	Texas	Colorado river	C. Mohr	do	0.230	17	5
	1036	Massachusetts	Danvers	J. Robinson	Gravelly	0.160	7	17
225. <i>Ulmus racemosa</i> ..... <i>Rock Elm. Cork Elm. Hickory Elm. White Elm. Olive Elm.</i>	110 <sup>1</sup>	Michigan	Dansville	W. J. Beal	do			
	110 <sup>2</sup>	do	Big Rapids	do	Low, gravelly			
	110 <sup>3</sup>	do	do	do	do			
	116 <sup>4</sup>	do	Hudson	do	Alluvial			
	314	do	Hershey	do	Rich loam			
	428	Tennessee	Nashville	A. Gattinger	do			
	226. <i>Ulmus alata</i> ..... <i>Wahoo. Winged Elm.</i>	133	South Carolina	Bonneau's Depot	H. W. Ravenel	do		
380		Tennessee	Davidson county	A. Gattinger	Loam			
533		Mississippi	Kemper's mill	C. Mohr	Alluvial	0.244	82	98

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
1.1195	1.0855		1.1025	4.00	4.48	4.72		0.25 sap-wood	400
1.0900	1.0765	1.0640	1.0768	1.82	1.00	1.80		0.5 sap-wood	1120
1.0822	1.1010		1.0921	1.05	1.82	1.74			1206
			1.0905			2.78	67.00		
0.5045	0.5000		0.5772	5.20	5.11	5.10	35.07		1110
0.6280	0.7185		0.6730	1.05	1.03	1.04		Ash of a knot, 1.85	324
0.7807	0.7640		0.7754	1.41	1.80	1.80			920
			0.7245			1.20	43.15		
0.8923	0.8358		0.8301	1.30	1.00	1.15			304
0.7002			0.7002	0.70		0.70			303
0.6400			0.6400	0.60		0.60			304
0.5800	0.5528		0.5610	0.86	0.81	0.84			101
0.6700			0.6700	0.82		0.82			120
0.6841	0.6841		0.6841	0.68	0.70	0.74			134
0.6540	0.7680		0.7005	1.24	0.84	1.04			300
0.7330	0.6303		0.6817	0.12	0.11	0.12			300
0.6700			0.6700	1.22	1.01	1.27			420
0.7613	0.7823		0.7823	1.07	0.70	0.88			300
0.7078	0.8100								
			0.6950			0.83	43.45		
0.5402	0.5300		0.5380	0.80	0.82	0.84		Specific gravity of wet sap-wood, 1.020	10
0.7450	0.7287		0.7373	0.40	0.50	0.48		Second sp. gr. determination made on sap-wood	202
0.6221	0.6054	0.6340	0.6207	0.03		0.03			2811
0.6200			0.6200	0.86		0.86			2817
0.6405	0.6480	0.6205	0.6413	1.04	0.00	1.02		First sp. gr. determination made on 0.5 sap-wood; second sp. gr. determination made on 0.75 sap-wood; third sp. gr. determination made on sap-wood	008
0.6382	0.7102	0.6742	0.6742	0.75	1.01	0.88		Third sp. gr. determination made on sap-wood	1030
0.7173	0.7085	0.7110	0.7154	0.75	0.45	0.60		First sp. gr. determination made on 0.25 sap-wood; second and third sp. gr. determinations made on sap-wood.	1040
			0.0500			0.80	40.54		
0.8144			0.8144	0.42		0.42			1104
0.0840			0.0840						1104
0.0608	0.5000		0.0400	0.34		0.34			1107
0.7845			0.7845	0.70		0.70			1104
0.7200	0.7670		0.7430	0.50	0.00	0.64			314
0.7414			0.7414	0.00	0.72	0.81			428
			0.7303			0.00	45.20		
0.8710	0.8544		0.8027	1.02	1.12	1.07		All sap-wood	133
0.6070	0.6220		0.6100	1.14	1.17	1.10		0.5 sap-wood	380
0.7603	0.7800		0.7740	0.70	0.72	0.74			532
			0.7401			0.00	40.00		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
227. <i>Planera aquatica</i> .....	758	Florida .....	Chattahoochee .....	A. H. Curtiss .....	Rich, alluvial .....	0.246	38	.....
	918	do .....	do .....	C. Mohr .....	do .....			
228. <i>Celtis occidentalis</i> .....	69	Missouri .....	Allenton .....	G. W. Letterman .....	Limestone .....	0.108	50	.....
	75 <sup>1</sup>	do .....	do .....	do .....	Low, rich .....			
	75 <sup>2</sup>	do .....	do .....	do .....	Alluvial .....			
	806	Texas .....	Dallas .....	J. Reverchon .....	do .....			
	375	Tennessee .....	Davidson county .....	A. Gattinger .....	Loam .....			
	864	Massachusetts .....	Plum Island .....	J. Robinson .....	Sandy .....		4	30
	873	do .....	Salem .....	do .....	Loam .....			
1111	Missouri .....	Saint Louis .....	Henry Eggert .....	Moist loam .....	0.132	23	.....	
228. <i>Celtis occidentalis</i> , var. <i>reticulata</i> .....	652	Arizona .....	Santa Rita mountains .....	G. Engelmann and C. S. Sargent .....	Dry .....			
229. <i>Ficus aurea</i> .....	486	Florida .....	Bay Biscayne .....	A. H. Curtiss .....	Coral .....			
230. <i>Ficus brevifolia</i> .....	1204	do .....	Key Largo .....	do .....	do .....			
231. <i>Ficus pedunculata</i> .....	508	do .....	Boca Chicoa Key .....	do .....	do .....			
232. <i>Morus rubra</i> .....	182	Missouri .....	Allenton .....	G. W. Letterman .....	Rich loam .....			
	433	Tennessee .....	Nashville .....	A. Gattinger .....	do .....			
233. <i>Morus microphylla</i> .....	450	New Mexico .....	Silver City .....	E. J. Greene .....	Moist clay .....	0.078	7	25
	1106	Texas .....	Austin .....	S. B. Buckley .....	Limestone .....	0.098	4	25
234. <i>Maclura aurantiaca</i> .....	253	do .....	Dallas .....	J. Reverchon .....	Bottom .....			
	421	Pennsylvania .....	West Chester .....	S. P. Sharples .....	Clay loam .....	0.710	3	44
PLATANACEÆ.								
235. <i>Platanus occidentalis</i> .....	21	Massachusetts .....	Arnold Arboretum .....	C. S. Sargent .....	Drift .....	0.680	35	53
	126	Missouri .....	Allenton .....	G. W. Letterman .....	Rich, alluvial .....			
	195	Ohio .....	Miami valley .....	E. E. Barney .....	do .....	4		
236. <i>Platanus racemosa</i> .....	686	California .....	Carmel river .....	G. R. Vasey .....	Clay .....	0.280	20	.....
237. <i>Platanus Wrightii</i> .....	648	Arizona .....	Santa Rita mountains .....	G. Engelmann and C. S. Sargent .....	Rich, gravelly .....			
JUGLANDACEÆ.								
238. <i>Juglans cinerea</i> .....	16	Massachusetts .....	Arnold Arboretum .....	C. S. Sargent .....	Drift .....	0.560	5	50
	76 <sup>1</sup>	Missouri .....	Allenton .....	G. W. Letterman .....	Rich loam .....			
	76 <sup>2</sup>	do .....	do .....	do .....	Alluvial .....			
	123	Michigan .....	Dansville .....	W. J. Beal .....	Gravelly clay .....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5735	0.5631		0.5683	0.48	0.48	0.48		All sap-wood	758
0.4074	0.5137		0.4906	0.42	0.42	0.42		All sap-wood	818
			0.5294			0.45	32.99		
0.7802	0.7419		0.7611	1.89	1.89	1.89		<i>C. pumila</i>	69
0.6858			0.6858	0.74		0.74			75 <sup>1</sup>
0.6592			0.6592	0.68		0.68			75 <sup>2</sup>
0.6910	0.7037		0.7274	1.70	1.60	1.65			306
0.8384	0.7956		0.8170	0.97	0.90	0.94		<i>C. Mississippiensis</i>	375
0.7784	0.7186	0.7385	0.7452	1.05	0.75	0.90			864
0.7909	0.7908	0.7604	0.7837	0.89	1.07	0.98			873
0.6570	0.6547	0.6396	0.6504	0.89	0.94	0.92			1111
			0.7287			1.09	45.41		
0.7400	0.7150		0.7275	1.32	1.12	1.22	45.34		652
0.2537	0.2605		0.2616	5.17	4.88	5.03	16.30		486
0.6321	0.6475		0.6398	4.55	4.18	4.36	39.87		1204
0.4680	0.4798		0.4739	4.83	5.00	4.92	29.53		508
0.6242	0.5993		0.6118	0.77	0.60	0.68			132
0.5679			0.5679	0.69	0.78	0.74			433
			0.5898			0.71	36.76		
0.7169	0.7157		0.7163	0.57	0.54	0.56			450
0.8270	0.8262		0.8266	0.70	0.82	0.81			1106
			0.7715			0.68	48.08		
0.7841	0.7495		0.7668	0.87	0.88	0.88	47.78		253
0.8551	0.7054		0.7803	0.38	0.50	0.49	48.63	Cultivated. First sp. gr. determination made on limb-wood; second sp. gr. determination made on root-wood.	421
			0.7736			0.68	48.21		
0.6000	0.6111		0.6086	0.35	0.32	0.33			21
0.6073	0.5748		0.5911	0.47	0.67	0.57			123
0.4986	0.5001		0.5038	0.40	0.57	0.48			195
			0.5078			0.46	35.38		
0.5151	0.4609		0.4880	1.17	1.05	1.11	30.41		686
0.4783	0.4688		0.4736	1.34	1.36	1.35	29.51	Grown at 4,000 feet altitude.	648
0.4183	0.4343		0.4263	0.35	0.30	0.33			16
0.4014	0.4005		0.4010	0.49	0.43	0.46			76 <sup>1</sup>
0.4633	0.4355		0.4494	0.60		0.60			76 <sup>2</sup>
0.3638			0.3638	0.70		0.70			123

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
238. <i>Juglans cinerea</i> —continued	145	Illinois	Waukegan	Robert Douglas	Alluvial			
	176	Ohio	Barney & Smith Manufacturing Co.	E. E. Barney				
	303	Michigan	Lansing	W. J. Beal	Gravelly loam			29
	1057	Massachusetts	Topsfield	J. Robinson	Drift	0.152	8	37
239. <i>Juglans nigra</i> <i>Black Walnut.</i>	112	Missouri	Allenton	G. W. Letterman	Alluvial			
	117	Michigan	Dansville	W. J. Beal	Gravelly			
	140	Illinois	Waukegan	Robert Douglas	Loam			
	200	Ohio	Barney & Smith Manufacturing Co.	E. E. Barney				
	318	Michigan	Lansing	W. J. Beal	Loam			
	325	Texas	Dallas	J. Reverchon	Alluvial	0.272	24	84
	407		Charlestown Navy-yard.	S. H. Pook				
	480	Tennessee	Nashville	A. Gattinger	Limestone			
	766	Florida	Aspalaga	A. H. Curtiss	Clay	0.286	8	23
	984	Texas	Austin	C. Mohr	Moist, calcareous			
951	do	New Braunfels	do	do				
240. <i>Juglans rupestris</i> <i>Walnut.</i>	415	New Mexico	Pinos Altos mountains.	E. L. Greene	Alluvial	0.207	15	32
	672	California	Contra Costa county.	G. R. Vasey	do	0.313	11	18
	1227	Arizona	Santa Catalina mountains.	C. G. Pringle				
241. <i>Carya olivæformis</i> <i>Pecan. Illinois Nut.</i>	322 <sup>1</sup>	Mississippi	Greenville	C. Mohr	Alluvial	0.260	83	48
	322 <sup>2</sup>	do	do	do	do			
	326	Texas	Dallas	J. Reverchon	do			
242. <i>Carya alba</i> <i>Shell-bark Hickory. Shag-bark Hickory.</i>	3	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.305	25	37
	20 <sup>1</sup>	Kentucky	Danville	W. M. Linney	Shale			
	20 <sup>2</sup>	do	do	do	do			
	20 <sup>3</sup>	do	do	do	do			
	48	Missouri	Allenton	G. W. Letterman	Upland			
	118 <sup>1</sup>	Michigan	Hudson	W. J. Beal	Clay			
	118 <sup>2</sup>	do	do	do	do			
	118 <sup>3</sup>	do	Lansing	do	do			
	152	Missouri	Allenton	G. W. Letterman	Rich upland			
	249	Virginia	Wytheville	H. Shriver	Clay			
	422	Missouri	Allenton	G. W. Letterman	Alluvial			
	531	Mississippi	Kemper's mill	C. Mohr	do	0.288	28	81
	539	do	do	do	do	0.306	31	102
	816	West Virginia	Grafton	C. G. Pringle	do			
1056	Massachusetts	Topsfield	J. Robinson	Rich loam	0.250	53		
1007	Missouri	Allenton	G. W. Letterman	Alluvial				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4304	0.4388		0.4301	0.51		0.51		145	
0.3941	0.4023		0.3982	0.44	0.44	0.44		176	
0.3970			0.3970	0.43		0.43		393	
0.4538	0.4355	0.4008	0.4530	0.41	0.53	0.47		1057	
			0.4080			0.51	25.46		
0.5778	0.5881		0.5830	0.63		0.63		112	
0.5807			0.5807	0.48		0.48		117	
0.5570	0.5550		0.5560	0.12	0.12	0.12		149	
0.5025	0.5205		0.5145	0.63	0.40	0.50		209	
0.6319	0.6101		0.6252	0.62		0.62		818	
0.5608	0.5833		0.5721	1.92	1.99	1.96		325	
0.5750			0.5750	0.60	0.60	0.65		407	
0.6370			0.6370	0.93	1.05	0.99		430	
0.6415	0.6363		0.6403	0.78	0.65	0.68	First sp. gr. determination made on sap-wood	766	
0.6435	0.6400			0.51	0.77				
0.7830	0.8002		0.7916	1.22	1.64	1.43	First sp. gr. determination made on 0.5 sap-wood	934	
0.6609	0.6888		0.6409	0.71	0.57	0.64		951	
			0.6115			0.79	38.11		
0.6780	0.6460	0.6753	0.6670	0.57	1.00	0.83	All sap-wood	415	
0.6206	0.5611		0.5939	0.85	0.97	0.91		672	
0.7258	0.6848		0.7053	1.15	1.42	1.28		1227	
			0.6554			1.01	40.85		
0.7300	0.6925		0.7158	0.96	1.18	1.07	Second sp. gr. determination made on 0.5 sap-wood	322 <sup>1</sup>	
0.7020	0.6982		0.7001	0.93		0.93	Second sp. gr. determination made on 0.5 sap-wood	322 <sup>2</sup>	
0.7314	0.7445		0.7380	1.33	1.46	1.40		326	
			0.7180			1.13	44.75		
0.7618	0.7814		0.7716	0.61	0.58	0.60	All sap-wood	3	
0.9680			0.9680	0.73		0.73	All sap-wood	29 <sup>1</sup>	
0.9205			0.9205	0.86		0.86	All sap-wood	29 <sup>2</sup>	
0.9859	1.0080		0.9970	0.65		0.65	All sap-wood	29 <sup>3</sup>	
0.8240	0.8260		0.8255	0.37	0.43	0.40		48	
0.8028			0.8028	0.28		0.28		118 <sup>1</sup>	
0.7974			0.7974	0.66		0.66		118 <sup>2</sup>	
0.8010			0.8010	1.14		1.14		118 <sup>3</sup>	
0.8064	0.7677		0.7871	0.87	0.66	0.77	All sap-wood	152	
0.8470	0.7477		0.7974	0.63	0.93	0.78		249	
0.7280	0.7756		0.7523	0.92	0.90	0.91		422	
0.8606	0.9370		0.9038	0.79	0.78	0.79		531	
0.8729	0.8692		0.8711	0.78	0.88	0.83		539	
0.7470	0.7505		0.7523	0.76	0.66	0.71		816	
0.8800	0.9035	0.9245	0.9027	0.54	0.69	0.62		1056	
0.6835	0.8051		0.7443	0.90	0.90	0.90		1097	
			0.8372			0.73	52.17		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
243. <i>Carya sulcata</i> ..... <i>Big Shell-bark. Bottom Shell-bark.</i>	27	Kentucky	Mercer county	W. M. Linney	Limestone			
	91 <sup>a</sup>	do	do	do	Alluvial			
	91 <sup>b</sup>	do	do	do	do			
	336	Tennessee	Nashville	A. Gattinger	do			
	383	Missouri	Allenton	G. W. Letterman	do			
	391	do	do	do	do			
	1082	do	do	do	do			
	1104	do	do	do	do			
	1165	do	do	do	do			
	1166	do	do	do	do			
1170	do	do	do	do				
244. <i>Carya tomentosa</i> ..... <i>Mocker Nut. Black Hickory. Bull Nut. Big-bud Hickory. White-heart Hickory. King Nut.</i>	52	do	do	do	Rich upland			
	72	Kentucky	Perryville	W. M. Linney	Utica shale			
	254	Missouri	Allenton	G. W. Letterman	Rich upland			
	280	do	do	do	do			
	348	Alabama	Citronello	C. Mohr	Sandy	0.200	42	31
245. <i>Carya porcina</i> ..... <i>Pig Nut. Brown Hickory. Black Hickory. Switch-bud Hickory.</i>	0	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.317	29	55
	51	Missouri	Allenton	G. W. Letterman	Flinty			
	88	do	do	do	Rich loam	0.159	41	6
	121	Michigan	Dansville	W. J. Beal	Gravelly clay			
	288	Missouri	Allenton	G. W. Letterman	Rich loam	0.100	47	13
	442	Tennessee	Nashville	A. Gattinger	Upland			
	538	Alabama	Kemper's mill	C. Mohr	Alluvial	0.354	63	59
	1051	Massachusetts	North Reading	J. Robinson	Drift	0.228	31	42
	1098	Missouri	Allenton	G. W. Letterman	Flinty			
1168	do	do	do	do				
246. <i>Carya amara</i> ..... <i>Bitter Nut. Swamp Hickory.</i>	153	do	do	do	Rich upland			
	401	do	do	do	do			
	838	Massachusetts	Danvers	J. Robinson	Rich loam			
	871	do	do	do	do	0.115	18	19
247. <i>Carya myristiciformis</i> ..... <i>Nutmeg Hickory.</i>	237	South Carolina	Bonneau's Depot	H. W. Ravenel	Rich, swampy	0.402	7	107
248. <i>Carya aquatica</i> ..... <i>Water Hickory. Swamp Hickory. Bitter Pecan.</i>	129	do	do	do	Swampy			
	302	Mississippi	Vicksburg	C. Mohr		0.277	28	18
	740	Georgia	Bainbridge	A. H. Curtiss	Alluvial			
	917	Florida	Chattahoochee	C. Mohr	do	0.262	23	28

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.8701	0.8707		0.8779	0.72	0.70	0.71		27	
0.7527	0.6859		0.7198	1.69		1.09		91 <sup>a</sup>	
0.7345			0.7345	1.04		1.04		91 <sup>b</sup>	
0.7654			0.7654					836	
0.8020	0.8610		0.8815	0.99	0.92	0.96		First sp. gr. determination made on 0.5 sap-wood. 283	
0.8512	0.8424		0.8408	0.91	1.24	1.07		391	
0.8011	0.9001	0.8831	0.8934	0.83	0.90	0.87		All sap-wood 1082	
0.8827	0.8854		0.8840	0.81	0.84	0.83		1164	
0.7054	0.0898	0.7414	0.7122	0.73	0.72	0.73		1165	
0.8508	0.8432		0.8470	0.90	0.95	0.93		0.5 sap-wood. 1166	
0.8024	0.7275	0.7389	0.7563	0.84	0.71	0.78		1170	
			0.8108			0.90	50.53		
0.8524	0.8168		0.8346	0.97	0.84	0.91		52	
0.8610	0.8709		0.8660	1.02	1.06	1.04		0.5 sap-wood 72	
0.8834	0.8500		0.8417	0.72	1.05	0.89		Second sp. gr. determination made on sap-wood; second growth 254	
	0.7279		0.7279	1.29	1.65	1.47		289	
0.8916	0.8402		0.8389	0.99	1.03	1.01		First sp. gr. determination made on 0.5 sap-wood; second sp. gr. determination made on sap-wood. 348	
			0.8218			1.06	51.21		
0.8157	0.8130		0.8148	0.60	0.60	0.60		6	
0.8827			0.8927	1.25	1.40	1.33		51	
0.9189	0.9200		0.9240	0.85	0.85	0.85		Second sp. gr. determination made on sap-wood; second growth 83	
0.6803			0.6803	1.58		1.58		121	
0.8554	0.8530		0.8542	0.83	0.71	0.77		First sp. gr. determination made on sap-wood; second sp. gr. determination made on 0.9 sap-wood. 288	
0.7926			0.7926	0.68	0.70	0.69		All sap-wood 442	
0.8530	0.7152		0.7841	0.82	0.86	0.84		First sp. gr. determination made on 0.8 sap-wood; second sp. gr. determination made on sap-wood. 538	
0.8842	0.8481	0.8537	0.8620	0.74	0.75	0.75		Third sp. gr. determination made on sap-wood 1051	
0.8990	0.7040		0.8815	1.27	1.29	1.28		Second sp. gr. determination made on sap-wood 1098	
0.7470	0.7355	0.8013	0.7913	1.15	1.19	1.17		All sap-wood 1168	
			0.8217			0.99	51.21		
0.7814	0.7830		0.7822	1.00	0.97	0.99		153	
0.5927	0.5754		0.5841	0.97	0.93	0.95		401	
0.7530	0.7142		0.7336	0.94	1.03	0.99		836	
0.9208			0.9208	1.42	0.92	1.17		0.5 sap-wood 871	
			0.7552			1.03	47.06		
0.7919	0.8112		0.8016	1.07	1.05	1.06	49.96	All sap-wood 237	
0.7039	0.7892		0.7486	1.31	2.03	1.67		All sap-wood 129	
0.7719	0.7700		0.7710	1.05	1.32	1.19		0.5 sap-wood 362	
0.8248	0.8244		0.8246	1.32	1.05	1.10		0.5 sap-wood 740	
0.6422	0.6913	0.6821	0.6185	0.91	1.17	1.04		0.5 sap-wood 917	
			0.7407			1.27	46.16		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
<b>MYRICACEÆ.</b>								
349. <i>Myrica corifera</i> ..... <i>Bayberry. Wax Myrtle.</i>	586	Florida	Saint John's river	A. H. Curtiss	Sandy loam	0.198	18	23
250. <i>Myrica Californica</i> .....	665	California	Santa Cruz	G. Engelmann and C. S. Sargent.	Rich loam			
<b>CUPULIFERÆ.</b>								
251. <i>Quercus alba</i> .....	8	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.560	12	88
	26	do	Acushnet	E. A. Dana				
	32 <sup>1</sup>	Kentucky	Mercer county	W. M. Linney	Limestone			
	32 <sup>2</sup>	do	Boyle county	do	Slate			
	32 <sup>3</sup>	do	do	do	Shale			
	40 <sup>1</sup>	Missouri	Allenton	G. W. Letterman	Rich upland			
	40 <sup>2</sup>	do	do	do	do			
	40 <sup>3</sup>	do	do	do	do			
	113 <sup>1</sup>	Michigan	Big Rapids	W. J. Beal	Gravelly	0.374	34	18
	113 <sup>2</sup>	do	Dansville	do	Sandy			
	113 <sup>3</sup>	do	Hudson	do				
	150	Illinois	Waukegan	Robert Douglas	Gravelly clay			
	169	Ohio	Pineo, Daniels & Co.	E. E. Barney				
	196	do	Barney & Smith Manufacturing Co.	do				
	228 <sup>1</sup>	Vermont	Champlain valley	C. G. Pringle	Clay			
	228 <sup>2</sup>	do	Charlotte	do	Gravelly loam			
	228 <sup>3</sup>	do	do	do	do			
	238	South Carolina	Bonneau's Depot	H. W. Ravenel	Rich, damp loam			
	250	Virginia	Wytheville	H. Shriver	Clay			
	251	do	do	do		0.225	50	
	250 <sup>1</sup>	do	do	do	Gravelly			
	250 <sup>2</sup>	do	do	do	do			
	250 <sup>3</sup>	do	do	do	do			
	403	Maryland	Charlestown Navy-yard.	S. H. Pook				
	443	Tennessee	Nashville	A. Gattinger	Rich bottom			
	547	Alabama	Kemper's mill	C. Mohr	Alluvial			
	748	Florida	Chattahoochee	A. H. Curtiss	Clay	0.286	8	48
	749	do	do	do	do	0.248	13	74
	805	Massachusetts		M. C. Beedle				
	1050	do	North Reading	J. Robinson		0.203	7	11
	1257		Charlestown Navy-yard.	S. H. Pook				
252. <i>Quercus lobata</i> .....	670	California	Redding	G. R. Vasey	Gravelly loam	0.356	15	17
253. <i>Quercus Garryana</i> ..... <i>White Oak.</i>	985	Oregon	Weidler's saw-mill.	G. Engelmann and C. S. Sargent.	Rich loam	0.393	30	82
	988	do	Portland.	do				
	1027	do	Portland Furniture Company.	do				
	1029	do	do	do				
254. <i>Quercus obtusiloba</i> ..... <i>Post Oak. Iron Oak.</i>	371	Kentucky	Harrodsburg	W. M. Linney	Shale			
	372	do	do	do	do			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5699	0.5692	0.5711	0.5637	0.54	0.47	0.51	35.13		580
0.5723	0.5619								
0.6793	0.6013		0.6703	0.38	0.33	0.33	41.77		665
0.7165	0.7093		0.7129	0.37	0.31	0.34			8
0.7970	0.8012		0.7991	0.30	0.25	0.28			26
0.8480	0.8451	0.7965	0.8209	0.45	0.47	0.46			321
0.6328			0.6328						322
0.6306			0.6306						323
0.6065	0.6526		0.6746	0.37	0.43	0.40			401
0.7820			0.7826	0.45		0.45			402
0.6829	0.7385		0.7107	0.30		0.30			403
0.6006			0.6006	0.37		0.37			1131
0.6852	0.7012		0.6932	0.41		0.41			1132
0.7017			0.7017	0.24		0.24			1133
0.7892	0.8735		0.8314	0.47	0.42	0.45			150
0.7672			0.7672	0.21	0.23	0.22			169
0.6203	0.6905		0.6254	0.57	0.65	0.61			196
0.8304			0.8304	0.39		0.39			2281
0.8070			0.8070	0.33		0.33			2282
0.8001			0.8001	0.37		0.37			2283
0.7830	0.7391		0.7611	0.43	0.42	0.43			238
0.7874	0.7419		0.7647	0.35	0.38	0.34			250
0.6848	0.6984		0.6916	0.21	0.25	0.23			251
0.7556			0.7556						2591
0.7069			0.7069	0.30		0.30			2592
0.8056			0.8056	0.37		0.37			2593
0.7390	0.7437		0.7414	0.49	0.44	0.47			403
0.6549			0.6549	1.37	1.64	1.51			443
0.8566	0.7794		0.8180	0.45	0.29	0.37			547
0.7732	0.7562		0.7647	0.47	0.50	0.49		Brush: rough bark	748
0.8066	0.8228		0.8147	0.34	0.31	0.33		Tough: smooth bark	749
0.7672	0.7734		0.7703	0.33	0.37	0.35		Taken from beam in old court-house at Cambridge, built in 1757.	895
0.8005	0.7584	0.7868	0.7609	0.26	0.22	0.24			1050
			0.8439						1257
			0.7470			0.41	46.35		
0.7840	0.7072	0.6706	0.7409	0.25	0.34	0.30	46.17	Third sp. gr. determination made on sap-wood	670
0.7814	0.8425		0.8120	0.33	0.25	0.29			985
0.6549	0.7000		0.7075	0.33	0.33	0.33			988
0.7478	0.7574	0.7704	0.7585	0.37	0.41	0.39		Brush	1027
0.6698	0.7869		0.7034	0.62	0.49	0.56		Tough	1029
			0.7453			0.39	46.45		
0.8200	0.8008		0.8104	0.62		0.62		Second sp. gr. determination made on 0.5 sap-wood	371
0.8765			0.8765	0.74		0.74		0.5 sap-wood	372

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
254. <i>Quercus obtusiloba</i> —continued	373	Kentucky	Harrodsburg	W. M. Linney	Shale			
	151	South Carolina	Bonneau's Depot	H. W. Ravenel	Rich upland			
	256	Missouri	Allenton	G. W. Letterman	Clay			
	351	Alabama	Citronelle	C. Mohr	do	0.244	38	88
	771	Florida	Aspalaga	A. H. Curtiss	Gravelly barrens	0.264	32	115
255. <i>Quercus undulata</i> , var. <i>Gambelii</i> <i>Scrub Oak.</i>	295	New Mexico	Pinos Altos mountains	E. L. Greene		0.196	18	67
	417	do	do	do				
	525	Colorado	Engelmann's cañon	Robert Douglas	Rocky			
	1150	Arizona	Santa Rita mountains	C. G. Pringle				
256. <i>Quercus macrocarpa</i> <i>Burr Oak. Mossy-cup Oak. Over-cup Oak.</i>	791	Kentucky	Mercer county	W. M. Linney	Alluvial			
	792	do	do	do	do			
	793	do	do	do	do			
	794	do	do	do	do			
	137	Missouri	Allenton	G. W. Letterman	Moist upland			
	143	Illinois	Waukegan	Robert Douglas	Rich			
	168	Ohio	Woodsum Machine Company	E. E. Barney				
	204	do	Barney & Smith Manufacturing Co.	do				
	310	Texas	Dallas	J. Reverchon	Rich, moist	0.528	13	120
	400	Missouri	Allenton	G. W. Letterman	Alluvial			
	412	Vermont	Charlotte	C. G. Pringle	Clay			
	492	Tennessee	Nashville	A. Gattinger	Alluvial			
	583	Illinois	Waukegan	Robert Douglas				
	831	do	Winnobago county	M. S. Bebb	Loam			
	892	do	do	do	do			
963	Texas	Austin	C. Mohr	Alluvial				
1071	Vermont	Charlotte	C. G. Pringle					
1072	do	do	do					
1073	do	do	do					
257. <i>Quercus lyrata</i> <i>Over-cup Oak. Swamp Post Oak. Water White Oak.</i>	424	Tennessee	Nashville	A. Gattinger	Low			
	545	Mississippi	Kemper's mill	C. Mohr	Alluvial	0.339	19	73
	762	Florida	Chatahoochee	A. H. Curtiss	do	0.260	20	70
	953	Texas	Matagorda bay	C. Mohr	Loam			
258. <i>Quercus bicolor</i> <i>Swamp White Oak.</i>	12	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.305	8	60
	541	Missouri	Allenton	G. W. Letterman	Alluvial			
	542	do	do	do	do			
	543	do	do	do	do			
	840	Massachusetts	West Newbury	J. Robinson	Low, swampy	0.206	5	80

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Thrd.	Average.	First.	Second.	Average.			
0.8150			0.8150	1.50		1.50			375
0.8920	0.8852	0.9170	0.8991	0.79	0.79	0.79			151
0.8522	0.8100		0.8350	0.46	0.52	0.49			256
0.7888	0.7510		0.7702	0.52	0.53	0.53			351
0.8548	0.7042	0.8072	0.8187	0.63	0.68	0.70			771
			0.8367			0.70	52.14		
0.8982	0.8502		0.8472						205
0.8080	0.7748	0.7862	0.8007	0.78	0.79	0.79		First sp. gr. determination made on 0.75 sap-wood.	417
0.7684	0.7804		0.7789	1.08	1.37	1.23			525
0.9187	0.9052		0.9270	1.10	0.80	0.95			1150
			0.8407			0.90	52.39		
0.7070			0.7070	0.90		0.90			702
0.7205			0.7205	0.60		0.60			703
0.7275	0.7275		0.7275	0.70		0.70			704
0.6120	0.6300		0.6303	1.18		1.18			705
0.8400			0.8400	0.41	0.37	0.39		Second growth.	127
0.8280	0.8270		0.8278	0.60	0.92	0.76			143
0.6440	0.6380		0.6410	0.31	0.32	0.32			168
0.6158	0.6177		0.6318	0.37	0.43	0.40			204
0.7722	0.8100		0.7944	1.08	1.03	1.06			310
0.6183	0.6411		0.6297	0.60	0.60	0.60			400
0.8030	0.8400		0.8563	0.20	0.27	0.27			412
0.7271			0.7271	0.74	0.75	0.75			482
0.9220	0.9543	0.9300	0.9387	1.18	1.46	1.32			583
0.6842	0.7112		0.6977	0.78	0.70	0.74		From fence-post 6 years in the ground.	831
0.6107	0.7075		0.6591	0.98	0.93	0.96		Old fence-post	832
0.7005	0.8402	0.8047	0.8018	1.11	1.18	1.15			933
0.7740	0.8087	0.7300	0.7720	0.46	0.46	0.46			1071
0.7845	0.7924	0.8018	0.7920	0.32	0.45	0.39			1073
0.7508	0.7630	0.7917	0.7615	0.44	0.35	0.40			1073
			0.7453			0.71	46.45		
0.8000	0.7863		0.7962	0.50	0.50	0.58			424
0.7862	0.7562		0.7662	0.22	0.23	0.23			545
0.8050	0.7040		0.7850	0.23	0.18	0.21			762
0.0700			0.0700	1.72	1.44	1.58			953
			0.8319			0.65	51.81		
0.7552	0.7815		0.7434	0.26	0.28	0.27			12
0.8010	0.8028		0.8022	0.30		0.30			541
0.0893			0.0893	0.08		0.08			542
0.7114			0.7114	0.08		0.08			543
0.8404	0.8180	0.8330	0.8307	0.27	0.31	0.29			846
			0.7062			0.58	47.75		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
259. <i>Quercus Michauxii</i> ..... <i>Basket Oak. Cow Oak.</i>	240	South Carolina	Bonneau's Depot....	H. W. Ravenel.....	Alluvial.....			
	524	Alabama	Kemper's mill.....	C. Mohr.....	do.....	0.323	22	60
	755	Florida	Chattahooches.....	A. H. Curtiss.....	do.....	0.260	12	32
200. <i>Quercus Prinus</i> ..... <i>Chestnut Oak. Rock Chestnut Oak.</i>	31 <sup>1</sup>	Kentucky	Boyle county.....	W. M. Linney.....	Shale.....			
	31 <sup>2</sup>	do	do.....	do.....	do.....			
	31 <sup>3</sup>	do	do.....	do.....	do.....			
	35	do	do.....	do.....	Limestone.....			
	434	Tennessee	Nashville.....	A. Gattinger.....	Rocky upland.....			
	925	Alabama	Cullman.....	C. Mohr.....	Dry, rocky.....	0.480	34	84
201. <i>Quercus prinoides</i> ..... <i>Yellow Oak. Chestnut Oak. Chinquapin Oak.</i>	28	Kentucky	Harrodsburg.....	W. M. Linney.....	.....			
	34 <sup>1</sup>	do	Mercer county.....	do.....	Limestone.....			
	34 <sup>2</sup>	do	Boyle county.....	do.....	Waverly shale.....			
	34 <sup>3</sup>	do	Mercer county.....	do.....	Utica shale.....			
	58	Missouri	Allenton.....	G. W. Letterman.....	Poor, hilly.....			
	273	do	do.....	do.....	Limestone.....			
	287	do	do.....	do.....	Flinty.....			
	323	Texas	Dallas.....	J. Reverchon.....	Calcareous.....	0.220	24	35
	514	Tennessee	Nashville.....	A. Gattinger.....	Alluvial.....			
	588	Texas	Dallas.....	J. Reverchon.....	do.....			
856	Massachusetts	Boxford.....	J. Robinson.....	Damp.....	0.304	10	123	
262. <i>Quercus Douglasii</i> ..... <i>Mountain White Oak. Blue Oak.</i>	688	California	Contra Costa county.....	G. R. Vasey.....	Clay.....	0.338	59	
	601	do	San Diego county.....	do.....	Dry, gravelly.....			
263. <i>Quercus oblongifolia</i> ..... <i>White Oak.</i>	700	do	San Gabriel.....	G. Engelmann.....	do.....	0.202	16	5
	419	New Mexico	Silver City.....	E. L. Greene.....	Dry, rocky.....	0.212	38	40
264. <i>Quercus grisea</i> ..... <i>White Oak.</i>	688	Arizona	Santa Rita mountains.....	G. Engelmann and C. S. Sargent.....	do.....			
	1145	do	do.....	C. G. Pringle.....	do.....			
	1148	do	do.....	do.....	do.....			
265. <i>Quercus reticulata</i> .....	1148	do	do.....	do.....	do.....			
266. <i>Quercus Durandii</i> .....	985	Texas	Austin.....	C. Mohr.....	Damp, calcareous.....	0.164	24	89
	1103	do	do.....	S. B. Buckley.....	do.....			
267. <i>Quercus virens</i> ..... <i>Live Oak.</i>	404	Florida	Charlestown Navy-yard.....	S. H. Pook.....	.....			
	799	do	Saint John's river.....	A. H. Curtiss.....	Sandy.....	0.238	89	15

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7074	0.8012		0.7003	0.33	0.48	0.40		240	
0.8253	0.7704		0.7079	0.57	0.57	0.57		524	
0.8200	0.8000		0.8145	0.38	0.35	0.37		755	
			0.8030			0.45	50.10		
0.7123	0.7102		0.7114	0.30		0.30		81 <sup>1</sup>	
0.6549	0.6650		0.6604	0.33		0.33		81 <sup>2</sup>	
0.7723			0.7723					81 <sup>3</sup>	
0.8508			0.8508	0.70	0.87	0.79		85	
0.0870			0.0870	1.04	1.03	1.04		434	
0.8550	0.8185		0.8308	0.40	0.40	0.45		925	
			0.7400			0.77	40.73		
0.8401	0.8410		0.8410	1.50	1.40	1.45		28	
0.7051			0.7051	1.49		1.40		34 <sup>1</sup>	
0.8712			0.8712	0.30	0.40	0.44		34 <sup>2</sup>	
0.9043			0.9043	1.02		1.02		34 <sup>3</sup>	
0.0500	0.0525		0.0540	1.30	1.25	1.32		58	
0.0237	0.8548		0.8803	1.10	1.31	1.24		273	
0.8248	0.8044		0.8440	0.04	0.57	0.01		287	
1.0240	1.0728		1.0484	1.25	1.00	1.17		323	
0.8502	0.8750		0.8071	1.43	1.40	1.40		514	
0.0183	0.0405		0.0294	1.38	1.22	1.30		588	
0.7052	0.7458	0.7700	0.7005	0.43	0.43	0.43		850	
			0.8005			1.14	53.03		
0.0058	0.7808		0.8028	0.80	0.88	0.84	55.64	Second sp. gr. determination made on sap-wood . . . . . 088	
1.0078	1.0700	1.0100	1.0480	4.02	4.60	4.07		First and second sp. gr. determinations made on sap-wood . . . . . 001	
0.0405	1.1500	1.0882		2.28	4.08				
0.8420	0.8374		0.8307	0.50	1.31	1.15		All sap-wood . . . . . 700	
			0.0441			2.01	58.84		
0.0171	0.0835	0.8703	0.0230	1.22	1.20	1.24		0.5 sap-wood . . . . . 410	
0.0807			0.0807	2.57	3.33	2.95		0.5 sap-wood . . . . . 093	
1.1340	1.0045		1.1143	1.32	1.10	1.20		114.5	
			1.0002			1.82	02.80		
0.0430	0.0328		0.0470	0.51	0.53	0.52	59.07	1148	
0.0702	0.8000		0.8775	1.71		1.75		0.5 sap-wood . . . . . 085	
0.8048	0.8000			1.80					
0.0040	1.0836		1.0238	1.82		1.82		1103	
			0.0507			1.78	50.25		
1.0850			1.0850					404	
0.8005	0.8040		0.8077	1.23	1.21	1.22		709	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
267. <i>Quercus virens</i> —continued .....	919	Alabama.....	Mobile county.....	C. Mohr.....	Rich, sandy.....			
	954	Texas.....	Matagorda bay.....	do.....	Sandy loam.....			
268. <i>Quercus chrysolepis</i> ..... <i>Live Oak. Mast Oak. Valparaiso Oak.</i>	574	Oregon.....	Saw-mill, Ashland.....	G. Engelmann and C. S. Sargent.....				
	649	California.....	San Bernardino.....	W. G. Wright.....				
	653	do.....	Marin county.....	G. R. Vasey.....	Gravelly.....			
269. <i>Quercus Emoryi</i> ..... <i>Black Oak.</i>	594	Arizona.....	Santa Rita mount- ains.....	G. Engelmann and C. S. Sargent.....	Dry, rocky.....			
270. <i>Quercus agrifolia</i> ..... <i>Encino Coast Live Oak.</i>	663	California.....	Marin county.....	G. R. Vasey.....	Loam.....	0.247		
271. <i>Quercus Wislizeni</i> ..... <i>Live Oak.</i>	677	do.....	Auburn.....	G. Engelmann.....				
272. <i>Quercus rubra</i> ..... <i>Red Oak. Black Oak.</i>	7	Massachusetts.....	Arnold Arboretum.....	C. S. Sargent.....	Drift.....	0.634	8	73
	45 <sup>1</sup>	Kentucky.....	Mercer county.....	W. M. Linney.....	Shale.....			
	45 <sup>2</sup>	do.....	do.....	do.....	do.....			
	89	Missouri.....	Allenton.....	G. W. Letterman.....	Rich loam.....	0.140	5	40
	92 <sup>1</sup>	Kentucky.....	Mercer county.....	W. M. Linney.....	Alluvial.....			
	92 <sup>4</sup>	do.....	do.....	do.....	Limestone.....			
	140	Michigan.....	Dansville.....	W. J. Beal.....	Sandy.....			
	141	do.....	do.....	do.....	do.....			
	146	Illinois.....	Waukegan.....	Robert Douglas.....	Gravelly.....			
	197	Ohio.....	Barney & Smith Manufacturing Co.....	E. E. Barney.....				
	215	Vermont.....	Charlotte.....	C. G. Pringle.....	Gravelly.....			
	216	do.....	do.....	do.....	do.....			
	217	do.....	do.....	do.....	do.....			
	218	do.....	do.....	do.....	do.....			
	273. <i>Quercus rubra, var. Texana</i> ..... <i>Red Oak.</i>	553	Alabama.....	Kemper's mill.....	C. Mohr.....	Alluvial.....	0.368	38
866		Massachusetts.....	Danvers.....	J. Robinson.....	Drift.....			
920		Mississippi.....	Enterprise.....	C. Mohr.....	Alluvial.....			
1043		Massachusetts.....	North Reading.....	J. Robinson.....	Drift.....	0.280	6	27
274. <i>Quercus tinctoria</i> ..... <i>Black Oak. Yellow-dark Oak. Quer- citron Oak. Yellow Oak.</i>	931	Texas.....	Austin.....	C. Mohr.....	Calcareous.....	0.118	13	20
	23	Massachusetts.....	Hingham.....	T. T. Bouvè.....	Light, sandy.....			
275. <i>Quercus coccinea</i> ..... <i>Scarlet Oak.</i>	752	Florida.....	Aspalaga.....	A. H. Curtiss.....	Clay.....	0.280	15	
	17	Massachusetts.....	Arnold Arboretum.....	C. S. Sargent.....	Drift.....	0.630	8	74
276. <i>Quercus tinctoria</i> ..... <i>Black Oak. Yellow-dark Oak. Quer- citron Oak. Yellow Oak.</i>	36 <sup>1</sup>	Kentucky.....	Danville Junction.....	W. M. Linney.....	Shale.....			
	36 <sup>2</sup>	do.....	do.....	do.....	do.....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.8225	0.9390		0.8778	1.25	1.80	1.27			819
1.0090	0.9709		0.9000	1.09	0.76	0.93		0.33 sap-wood	854
			0.9501			1.14	59.21		
0.7888	0.7502		0.7740	0.80	0.62	0.71			574
0.8830	0.8827		0.8820	0.33	0.34	0.34			649
0.8787	0.9083		0.8910	0.73	0.79	0.76			653
			0.8493			0.60	52.93		
0.9975	0.9019	}	0.9263	1.86	2.10	2.86	57.78	Second sp. gr. determination made on sap-wood	594
0.9201	0.8855			2.61	2.78				
0.8200	0.8216		0.8258	1.21	1.84	1.28	51.43		663
0.7958	0.7788	}	0.7855	0.94	0.98	1.02	48.95		677
0.8018	0.7657			0.96	1.18				
0.6381	0.6440		0.6411	0.14	0.10	0.12			7
0.5186	0.5910		0.5548	0.46		0.46			451
0.5160	0.6251		0.5710	0.43		0.43			452
0.7480			0.7480	0.27		0.27			89
0.5899			0.5899	0.47	0.47	0.47			921
0.7516	0.7512	0.7516	0.7515	0.15		0.15			924
0.6410			0.6410	0.20	0.21	0.21			140
0.5032			0.5052	0.23	0.24	0.24			141
0.7481	0.7514		0.7498	0.22	0.31	0.27			146
0.6516	0.6015		0.6566	0.16	0.17	0.17			197
0.6423	0.6997		0.6710	0.27	0.22	0.25			215
0.6897	0.7090		0.6994	0.20	0.24	0.22			216
0.6669	0.6667		0.6768	0.20	0.26	0.23		Second growth from stump	217
0.6765	0.7029		0.6897	0.33	0.32	0.33			218
0.6189	0.6589		0.6489	0.37	0.34	0.36			553
0.6036	0.6252	0.6573	0.6487	0.07	0.14	0.11			866
0.5244	0.5004		0.5424	0.25	0.21	0.23			920
0.7180	0.6806	0.6920	0.6952	0.14	0.19	0.17			1043
			0.6540			0.26	40.75		
0.9142	0.9018		0.9080	0.93	0.76	0.85	59.59	0.5 sap-wood	931
0.7111	0.7079		0.7095	0.11	0.16	0.14			23
0.7067	0.7762		0.7715	0.22	0.28	0.25			762
			0.7405			0.19	46.15		
0.7364	0.7305		0.7335	0.13	0.08	0.11			17
0.6863			0.6863	0.21		0.21			361
0.7205			0.7205	0.31		0.31			367

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
274. <i>Quercus tinctoria</i> —continued.	30 <sup>s</sup>	Kentucky	Danville Junction	W. M. Linney	Slate			
	41	Missouri	Allenton	G. W. Letterman	Hilly			
	74	do	do	do	Rich upland	0.165	6	16
	86	do	do	do	do			
	244	Virginia	Wytheville	H. Shriver	Clay			
	247	do	do	do	do			
	437	Tennessee	Nashville	A. Gattinger	do			
921	Alabama	Cullman	C. Mohr	Sandy				
275. <i>Quercus Kelloggii</i> <i>Black Oak.</i>	628	Oregon	Saw-mill, Ashland	G. Engelmann and C. S. Sargent.				
	963	do	Eugene City	G. H. Collier		0.224	17	78
276. <i>Quercus nigra</i> <i>Black Jack. Jack Oak.</i>	268	Missouri	Allenton	G. W. Letterman	Clay			
	339	Alabama	Citronelle	C. Mohr	Sandy	0.128	13	46
277. <i>Quercus falcata</i> <i>Spanish Oak. Red Oak.</i>	131	South Carolina	Bonneau's Depot	H. W. Ravenel	Rich loam			
	245	Virginia	Wytheville	H. Shriver	Clay			
	265 <sup>1</sup>	do	Carroll county	do	do			
	265 <sup>2</sup>	do	do	do	do			
	265 <sup>3</sup>	do	do	do	do			
	548	Mississippi	Kemper's mill	C. Mohr	Rich loam			
278. <i>Quercus Catesbaei</i> <i>Turkey Oak. Scrub Oak. Forked-leaf Black Jack. Black Jack.</i>	342	Alabama	Cottage Hill	do	Barren, sandy			
	770	Florida	Aspalaga	A. H. Curtiss	do	0.301	62	
270. <i>Quercus palustris</i> <i>Pin Oak. Swamp Spanish Oak. Water Oak.</i>	47	Missouri	Allenton	G. W. Letterman	Rich, alluvial			
	282	do	do	do	do			
280. <i>Quercus aquatica</i> <i>Water Oak. Duck Oak. Possum Oak. Pink Oak.</i>	349	Alabama	Cottage Hill	C. Mohr	Sandy loam	0.350	8	16
	511	Tennessee	Tullahoma	A. Gattinger	do			
	742	Georgia	Bainbridge	A. H. Curtiss	Alluvial	0.310	13	23
281. <i>Quercus laurifolia</i> <i>Laural Oak.</i>	756	Florida	Saint John's river	do	Sandy loam			
	801	do	do	do	do	0.240	33	26
282. <i>Quercus heterophylla</i> <i>Bartram's Oak.</i>	1171	New Jersey	Mount Holly	S. P. Sharples	Clay	0.329	6	19
283. <i>Quercus cinerea</i> <i>Upland Willow Oak. Blue Jack. Sand Jack</i>	352	Alabama	Citronelle	C. Mohr	Pine-barren			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7749			0.7749	0.18		0.18			363
0.7596	0.7352		0.7474	0.17	0.14	0.16			41
0.8014			0.8014	0.22	0.19	0.21		0.33 sap-wood; second growth	74
0.7192			0.7192	0.28	0.18	0.23			86
0.5070	0.5175		0.5123	0.44	0.63	0.54			244
0.7164	0.6586		0.6875	0.14	0.15	0.15			247
0.6765			0.6765	0.35	0.37	0.36			437
0.6622	0.6972	0.7100	0.6898	0.59	0.70	0.65			921
			0.7045			0.28	43.90		
0.6565	0.6582		0.6573	0.18	0.21	0.20			628
0.6273	0.6322		0.6297	0.33	0.30	0.32			963
			0.6435			0.26	40.10		
0.7304	0.7492		0.7398	0.96	0.92	0.94			268
0.7309	0.7192		0.7251	1.41	1.32	1.37		All sap-wood	339
			0.7324			1.16	45.64		
0.6892	0.7003		0.6948	0.27	0.27	0.27			131
0.5701	0.6780		0.6241	0.27	0.33	0.30			245
0.6613			0.6613	0.15		0.15			265 <sup>1</sup>
0.7334			0.7334	0.22		0.22			265 <sup>2</sup>
0.6556			0.6556	0.25		0.25			265 <sup>3</sup>
0.8052	0.7896		0.7874	0.29	0.28	0.29			548
			0.6928			0.25	43.17		
0.6679	0.6736		0.6708	0.85	0.80	0.83			342
0.7906	0.7854		0.7880	0.90	0.90	0.90			770
			0.7294			0.87	45.45		
0.6917	0.6465		0.6691	0.65	0.57	0.61			47
0.7480	0.6890		0.7185	0.92	1.07	1.00		Second growth	282
			0.6938			0.81	43.24		
0.7167	0.7149		0.7158	0.45	0.39	0.42			349
0.7084	0.7202		0.7143	0.82	0.84	0.83			511
0.7237	0.7624		0.7431	0.35	0.19	0.27			742
			0.7244			0.51	45.14		
0.7474	0.7075		0.7275	0.43	0.46	0.47		All sap-wood	756
0.8140	0.7995		0.8071	0.93	1.41	1.17			801
			0.7673			0.82	47.82		
0.6818	0.6834		0.6834	0.19	0.14	0.17	42.59		1171
0.6882	0.6802								
0.6502	0.6337		0.6420	1.27	1.15	1.21	40.00		352

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
284. <i>Quercus hypoleuca</i> .....	416	New Mexico.....	Pinos Altos mount- ains.	E. L. Greene.....	Dry, rocky.....	0.208	49	20
	599	Arizona.....	Santa Rita mount- ains.	G. Engelmann and C. S. Sargent.	do.....			
285. <i>Quercus imbricaria</i> ..... <i>Shingle Oak. Laurel Oak.</i>	40 <sup>1</sup>	Kentucky.....	Harrodsburg.....	W. M. Linney.....	Utica shale.....			
	40 <sup>2</sup>	do.....	do.....	do.....	do.....			
	40 <sup>3</sup>	do.....	do.....	do.....	do.....			
	50	Missouri.....	Allenton.....	G. W. Letterman.....	Rich, moist.....			
	185	do.....	do.....	do.....	Rich loam.....			
286. <i>Quercus Phellos</i> ..... <i>Willow Oak. Peach Oak.</i>	512	Tennessee.....	Tullahoma.....	A. Gattinger.....	Moist, siliceous.....	0.184	15	
287. <i>Quercus densiflora</i> ..... <i>Tanbark Oak. Chestnut Oak. Peach Oak.</i>	687	California.....	Marin county.....	G. R. Vasey.....	Gravelly.....	0.400	25	85
288. <i>Castanopsis chrysophylla</i> ..... <i>Chinquapin.</i>	729	do.....	Mendocino county..	A. Kellogg.....				
289. <i>Castanea pumila</i> ..... <i>Chinquapin.</i>	573	Arkansas.....	Hot Springs.....	G. W. Letterman.....	Sandy loam.....	0.615		
290. <i>Castanea vulgaris, var. Americana</i> ..... <i>Chestnut.</i>	18	Massachusetts.....	Arnold Arboretum..	C. S. Sargent.....	Drift.....	0.666	34	42
	258 <sup>1</sup>	Virginia.....	Fancy Gap.....	H. Shriver.....	Moist.....			
	258 <sup>2</sup>	do.....	do.....	do.....	do.....			
	258 <sup>3</sup>	do.....	do.....	do.....	do.....			
	516	Tennessee.....	Nashville.....	A. Gattinger.....	Sandy.....			
	727	Pennsylvania.....	Williamsport.....	C. G. Pringle.....				
	868	Massachusetts.....	Danvers.....	J. Robinson.....	Loam.....	0.110	4	21
291. <i>Fagus ferruginea</i> ..... <i>Beech.</i>	9	do.....	Arnold Arboretum..	C. S. Sargent.....	Drift.....	0.190	0	28
	44 <sup>2</sup>	Kentucky.....	Mercer county.....	W. M. Linney.....	Hudson River shale.			
	44 <sup>3</sup>	do.....	do.....	do.....	do.....			
	55 <sup>2</sup>	do.....	do.....	do.....	do.....			
	55 <sup>4</sup>	do.....	do.....	do.....	do.....			
	119	Michigan.....	Dansville.....	W. J. Beal.....	Gravelly.....			
	765	Florida.....	Chattahoochee.....	A. H. Curtiss.....	do.....	0.272	82	
853	Massachusetts.....	Hamilton.....	J. Robinson.....	do.....				
292. <i>Ostrya Virginia</i> ..... <i>Hop Hornbeam. Iron Wood. Lever Wood.</i>	11	do.....	Arnold Arboretum..	C. S. Sargent.....	Drift.....	0.285	26	44
	87	Missouri.....	Allenton.....	G. W. Letterman.....	Rich loam.....	0.085	35	
	870	Massachusetts.....	Danvers.....	J. Robinson.....	Rocky.....			
	877	do.....	do.....	do.....	Rich loam.....			
	1047	do.....	North Reading.....	do.....		0.190	62	14
293. <i>Carpinus Caroliniana</i> ..... <i>Hornbeam. Blue Beech. Water Beech. Iron Wood.</i>	46	Missouri.....	Allenton.....	G. W. Letterman.....	Damp, alluvial.....			
	73 <sup>1</sup>	Kentucky.....	Mercer county.....	W. M. Linney.....	Trenton limestone.			
	73 <sup>2</sup>	do.....	do.....	do.....	do.....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7828	0.8304	.....	0.8065	1.27	1.27	1.27	.....	All sap-wood .....	416
0.7774 0.8208	0.7735	0.8089	0.7952	1.21	1.35	1.41	.....	0.5 sap-wood .....	599
			0.8009						
0.7402	0.7394	.....	0.7398	0.23	.....	0.23	.....	.....	40 <sup>1</sup>
0.7234	.....	.....	0.7234	0.65	.....	0.65	.....	.....	40 <sup>2</sup>
0.8332	.....	.....	0.8332	0.79	.....	0.79	.....	.....	40 <sup>3</sup>
0.7517	0.7800	.....	0.7439	0.22	0.34	0.28	.....	.....	50
0.7200	0.7285	.....	0.7243	0.23	0.18	0.21	.....	Second growth .....	135
.....	.....	.....	0.7529	.....	.....	0.43	46.02	.....	.....
0.7532	0.7412	.....	0.7472	0.51	0.48	0.50	46.56	.....	512
0.6650	0.7004	.....	0.6827	1.55	1.41	1.49	42.55	.....	687
0.5520	0.5627	.....	0.5574	0.35	.....	0.35	34.74	0.33 sap-wood .....	729
0.5008	0.6076	.....	0.5887	0.12	0.11	0.12	36.69	.....	578
0.3820	0.3827	.....	0.3828	0.10	0.12	0.11	.....	.....	19
0.4720	.....	.....	0.4720	0.26	.....	0.26	.....	.....	258 <sup>1</sup>
0.4716	.....	.....	0.4716	0.21	.....	0.21	.....	.....	258 <sup>2</sup>
0.4404	.....	.....	0.4404	.....	.....	.....	.....	.....	258 <sup>3</sup>
0.4693	.....	.....	0.4693	0.18	0.21	0.20	.....	.....	516
0.4063	0.4247	.....	0.4455	0.16	0.17	0.17	.....	.....	727
0.4013	0.4594	0.4656	0.4621	0.14	0.12	0.13	.....	.....	868
.....	.....	.....	0.4504	.....	.....	0.18	28.07	.....	.....
0.6603	0.6556	.....	0.6610	0.34	0.33	0.34	.....	.....	9
0.6200	.....	.....	0.6200	0.75	.....	0.75	.....	Red beech .....	44 <sup>1</sup>
0.6343	.....	.....	0.6343	0.70	.....	0.70	.....	Red beech .....	44 <sup>2</sup>
0.7992	.....	.....	0.7992	0.57	.....	0.57	.....	White beech .....	55 <sup>1</sup>
0.7160	0.7200	.....	0.7175	0.54	.....	0.54	.....	White beech .....	55 <sup>2</sup>
0.7619	0.6605	.....	0.7112	0.31	0.38	0.35	.....	.....	119
0.6897	0.6560	.....	0.6729	0.47	.....	0.47	.....	.....	765
0.7017	0.6825	0.6870	0.6904	0.29	0.38	0.34	.....	First and second sp. gr. determinations made on 0.5 sap-wood; third sp. gr. determination made on sap-wood.	853
.....	.....	.....	0.6883	.....	.....	0.51	42.39	.....	.....
0.7608	0.7636	.....	0.7622	0.34	0.37	0.36	.....	.....	11
0.8919	.....	.....	0.8919	0.49	0.67	0.58	.....	.....	87
0.8512	0.8402	0.8870	0.8595	0.53	0.66	0.60	.....	.....	870
0.8491	0.8296	0.8534	0.8440	0.55	0.51	0.53	.....	.....	877
0.7818	0.7940	0.7763	0.7842	0.51	0.39	0.45	.....	.....	1047
.....	.....	.....	0.8284	.....	.....	0.50	51.62	.....	.....
0.7657	0.7711	.....	0.7684	0.76	0.80	0.78	.....	.....	46
0.7264	.....	.....	0.7264	0.80	0.79	0.80	.....	.....	73 <sup>1</sup>
0.7526	0.7504	.....	0.7515	1.34	.....	1.34	.....	.....	73 <sup>2</sup>

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH:	
							Sap-wood.	Heart-wood.
293. <i>Carpinus Caroliniana</i> —continued	77	Missouri	Allenton	G. W. Letterman	Rich, alluvial	0.052	22	
	872	Massachusetts	Danvers	J. Robinson	Low, rich			
	1088	do	do	do	Gravelly			
BETULACEÆ.								
294. <i>Betula alba</i> , var. <i>populifolia</i> <i>White Birch. Old-field Birch. Gray Birch.</i>	10	do	Arnold Arboretum	C. S. Sargent	Drift	0.170	10	26
	848	do	Danvers	J. Robinson	Gravelly	0.190	10	88
295. <i>Betula papyrifera</i> <i>Canoë Birch. White Birch. Paper Birch.</i>	223	Vermont	Charlotte	C. G. Pringle	Gravelly			
	224	do	do	do	do			
	225	do	do	do	do			
	722	Montana	Missoula	Sereno Watson	Wet			
	886	Massachusetts	Townsend	J. Robinson		0.284	26	
	990	Alaska	Chilkoot inlet	Paul Schultze		0.188	57	
	1065	Vermont	Charlotte	C. G. Pringle				
	1066	do	do	do				
1067	do	do	do					
296. <i>Betula occidentalis</i> <i>Black Birch.</i>	528	Colorado	Engelmann's cañon	Robert Douglas	Wet, sandy			
	629	California	Strawberry valley	G. Engelmann and C. S. Sargent	Wet, peaty			
297. <i>Betula lutea</i> <i>Yellow Birch. Gray Birch.</i>	155	Vermont	Charlotte	C. G. Pringle	Swampy			
	230 <sup>1</sup>	do	do	do	Clay			
	230 <sup>2</sup>	do	do	do	Gravelly			
	843	Massachusetts	Danvers	J. Robinson	do	0.100	34	
	1068	Vermont	Charlotte	C. G. Pringle	do			
	1069	do	do	do	do			
	1070	do	do	do	do			
298. <i>Betula nigra</i> <i>Red Birch. River Birch.</i>	136	Missouri	Allenton	G. W. Letterman	Moist loam			
	398	do	do	do	Alluvial			
	841	Massachusetts	North Andover	J. Robinson	do	0.102	30	
	842	do	do	do	do	0.214	32	8
	1184	Missouri	Allenton	G. W. Letterman	Sandy loam			
299. <i>Betula lenta</i> <i>Cherry Birch. Black Birch. Sweet Birch. Mahogany Birch.</i>	4	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.302	12	61
	221	Vermont	Charlotte	C. G. Pringle	Gravelly			
	844	Massachusetts	Danvers	J. Robinson	do	0.118	41	22

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.7591	0.6907		0.7249	0.60	0.52	0.56		77	
0.7014	0.7085	0.7137	0.7079	0.88	0.98	0.91		872	
0.7080	0.6804	0.6896	0.6927	0.55	0.65	0.60		1038	
			0.7286			0.83	45.41		
0.5961			0.5961	0.32	0.27	0.30		Sap-wood..... 10	
0.6930	0.6088	0.6061	0.6160	0.28	0.28	0.28		First and third sp. gr. determinations made on sap-wood..... 848	
			0.5760			0.29	35.90		
2.4504	0.4757		0.4076	0.24	0.24	0.24		All sap-wood..... 223	
0.6021	0.5979		0.6000	0.30	0.31	0.31		0.5 sap-wood..... 224	
0.6386	0.6207		0.6297	0.25	0.22	0.24		First sp. gr. determination made on 0.5 sap-wood; second sp. gr. determination made on 0.75 sap-wood. 225	
0.6240	0.6006		0.6168	0.25	0.22	0.24		All sap-wood..... 722	
0.6290	0.6260	0.6395	0.6315	0.20	0.19	0.20		All sap-wood..... 836	
0.6081	0.6060		0.6070	0.24	0.25	0.25		All sap-wood..... 990	
0.6801	0.6227	0.6112	0.6380	0.28	0.26	0.27		All sap-wood..... 1065	
0.6002	0.5665	0.5843	0.5827	0.25	0.24	0.25		All sap-wood..... 1066	
0.5894	0.5908	0.5745	0.5840	0.26	0.22	0.24		All sap-wood..... 1067	
			0.5955			0.25	37.11		
0.5880	0.6188		0.6032	0.18	0.18	0.18		All sap-wood..... 526	
0.6543	0.5777	0.5707	0.6028	0.44	0.37	0.41		629	
			0.6030			0.30	37.58		
0.5759	0.6237		0.5998	0.20	0.20	0.25		0.5 sap-wood..... 155	
0.7047			0.7047	0.33		0.33		0.875 sap-wood..... 230 <sup>1</sup>	
0.6416			0.6416	0.60		0.60		230 <sup>2</sup>	
0.7032	0.7200	0.7080	0.7104	0.16	0.25	0.20		All sap-wood..... 843	
0.6408	0.6293	0.6573	0.6445	0.28	0.25	0.27		1068	
0.6380	0.6472	0.6256	0.6369	0.28	0.22	0.25		1069	
0.6557	0.6543	0.6382	0.6494	0.27	0.27	0.27		1070	
			0.6553			0.31	40.84		
0.5608	0.5721		0.5665	0.30	0.31	0.31		All sap-wood..... 136	
0.5554	0.5508		0.5531	0.27	0.31	0.29		All sap-wood..... 398	
0.5910	0.5759	0.5811	0.5827	0.38	0.38	0.38		From butt: Sap-wood..... 841	
0.6049	0.5975	0.5995	0.5996	0.38	0.38	0.38		From top of trunk: Sap-wood..... 842	
0.5556	0.5836	0.5998	0.5793	0.44	0.40	0.42		1184	
			0.5762			0.35	35.91		
0.7555	0.7604		0.7579	0.16	0.20	0.18		All sap-wood..... 4	
0.7844	0.6945		0.7145	0.25	0.32	0.29		221	
0.8115	0.8160	0.8109	0.8128	0.26	0.33	0.30		All sap-wood..... 844	
			0.7617			0.26	47.47		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
300. <i>Alnus maritima</i> <i>Seaside Alder.</i>	809	Delaware	Adger's mill	W. M. Canby	Moist, sandy loam.	0.108	25	
	810	do	Pepper's mill	do	do			
301. <i>Alnus rubra</i> <i>Alder.</i>	987	Alaska	Sitka	Paul Schultze				
	901	Washington territory.	Puyallup	G. Engelmann and C. S. Sargent.				
	1025	Oregon	Portland Furniture Company.	do				
302. <i>Alnus rhombifolia</i> <i>Alder.</i>	717	Montana	Missoula	Sereno Watson	Wet			
	979	Oregon	Drain	C. S. Sargent	Moist loam			
303. <i>Alnus oblongifolia</i> <i>Alder.</i>	694	California	San Bernardino	W. G. Wright				
304. <i>Alnus serrulata</i> <i>Black Alder. Smooth Alder.</i>	541	Alabama	Stockton	C. Mohr	Wet			
	611	Georgia	Altamaha river	A. H. Curtiss	Damp	0.108	38	
305. <i>Alnus incana</i> <i>Speckled Alder. Hoary Alder. Black Alder.</i>	374	Vermont	Hinesburgh	C. G. Pringle	Wet loam			
	862	Massachusetts	Danvers	J. Robinson	do			
SALICACEÆ.								
306. <i>Salix nigra</i> <i>Black Willow.</i>	282	Vermont	Shelburne	C. G. Pringle	Wet, sandy			
	855	Massachusetts	Topsfield	J. Robinson	Alluvial	0.202	12	50
307. <i>Salix amygdaloides</i> <i>Willow.</i>	884	Utah	Salt Lake City	M. E. Jones	Clay			
	908	Colorado	Cañon City	E. Weston				
	911	do	do					
308. <i>Salix laevigata</i> <i>Willow.</i>	690	California	Santa Cruz	G. Engelmann and C. S. Sargent.	Moist, sandy			
309. <i>Salix lasiandra</i> <i>Willow.</i>	1219	do	do	C. L. Anderson				
309. <i>Salix lasiandra, var. lancifolia</i>	640	do	Strawberry valley	G. Engelmann and C. S. Sargent.	Moist, rich			
	981	Oregon	Portland	F. Skinner	Alluvial			
309. <i>Salix lasiandra, var. Fendleriana</i>	889	Utah	City Creek cañon	M. E. Jones	Gravelly			
310. <i>Salix longifolia</i> <i>Sand-bar Willow.</i>	1174	Illinois	Rockford	M. S. Bebb		0.120	4	11
310. <i>Salix longifolia, var. exigua</i>	955	Texas	Matagorda bay	C. Mohr	Moist, saline			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4988	0.5186		0.5087	0.34	0.35	0.35		809	
0.4923	0.4880		0.4906	0.37	0.47	0.42		810	
			0.4906			0.39	31.18		
0.4922	0.4851		0.4887	0.39	0.40	0.39		907	
0.4855	0.4847		0.4850	0.59	0.49	0.54		991	
0.4829	0.4565		0.4697	0.36	0.28	0.32		1025	
			0.4813			0.42	29.99		
{ 0.4556 }	0.3722	0.3604	0.4077	{ 0.39 }	0.45 }	0.39		First sp. gr. determination made on sap-wood; second sp. gr. determination made on 0.5 sap-wood.	717
{ 0.4427 }			0.4178				0.43 }		
0.4172	0.4183		0.4178	0.19	0.25	0.22		979	
			0.4127			0.31	25.72		
0.4188	0.3823		0.3981	0.42	0.48	0.42	24.81	604	
0.4714	0.4085		0.4675	0.32	0.34	0.33		541	
0.4578	0.4788		0.4656	0.47	0.39	0.43		011	
			0.4666			0.38	29.08		
0.4020	0.4842		0.4436	0.47	0.40	0.44		All sap-wood ..... 874	
0.4980	0.4642	0.4732	0.4778	0.38	0.40	0.39	28.71	0.75 sap-wood ..... 862	
			0.4607			0.42			
0.4327	0.4102		0.4215	0.62	0.79	0.71		232	
0.4790	0.4621	0.4676	0.4696	0.65	0.71	0.68		First and second sp. gr. determinations made on 0.66 sap-wood; third sp. gr. determination made on 0.5 sap-wood. 855	
			0.4456			0.70	27.77		
0.4530			0.4530	0.55	0.89	0.72		884	
0.4689	0.4443		0.4488	{ 1.08 }	0.91 }	1.11		One tree ..... { 908	
0.4613	0.4201		0.4509				1.08 }		1.08 }
			0.4572			0.92	28.10		
0.4916	0.4828		0.4872	0.56	0.60	0.58	30.36	690	
0.4810	0.4702		0.4756	0.60	0.59	0.60	29.64	1219	
0.4500	0.4536		0.4519	0.61	0.73	0.67		640	
0.5063	0.4573	0.4080	0.4575	1.09	0.72	0.91		981	
			0.4547			0.79	28.34		
0.4578	0.4619		0.4598	0.53	0.58	0.56	23.65	680	
0.4901	0.4959		0.4930	0.46	0.49	0.48	30.72	1174	
0.5221	0.5324	0.5482	0.5342	1.02	1.09	1.06	33.29	955	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
311. <i>Salix sessilifolia</i> .....	1143	Oregon .....	Mouth of Willamette river.	Jos. Howells.....	Alluvial .....			
312. <i>Salix discolor</i> .....	859	Massachusetts.....	Topsfield .....	J. Robinson.....	Loam .....	0.091	7	0
	1225	New York.....	Ellenburg .....	J. H. Sears.....	do .....			
313. <i>Salix flavescens</i> .....	641	New Mexico.....	Pinos Altos mountains.	E. L. Greene .....				
	721	Montana.....	Pattee's cañon, Missoula.	S. Watson .....	Rich, moist .....			
	888	Utah .....	City Creek cañon .....	M. E. Jones .....	Moist, gravelly .....	0.060	18	4
313. <i>Salix flavescens</i> , var. <i>Scouleriana</i> ..... <i>Black Willow</i> .	972	Washington territory.	Seattle.....	G. Engelmann and C. S. Sargent.	Moist, sandy.....	0.160	22	10
314. <i>Salix Hookeriana</i> .....	966	Oregon .....	Winchester bay .....	do .....	Sandy saline .....			
315. <i>Salix cordata</i> , var. <i>vestita</i> .....	1175	Nebraska.....	Brownsville .....	R. W. Furnas .....	Alluvial .....	0.148	5	11
	1180	Iowa.....	Sioux City .....	W. G. Wright.....	do .....	0.117	8	14
316. <i>Salix lasiolepis</i> .....	669	California .....	Santa Cruz.....	G. Engelmann and C. S. Sargent.	Sandy loam .....	0.128	16	
317. <i>Salix Hitchensis</i> .....	1161	Oregon .....	Sauvie's Island .....	Jos. Howells .....	Alluvial .....			
318. <i>Populus tremuloides</i> ..... <i>Aspen. Quaking Asp.</i>	272 <sup>1</sup>	Colorado.....	Alpine.....	T. S. Brandegee.....	Damp .....			
	272 <sup>2</sup>	do .....	do .....	do .....	do .....			
	272 <sup>3</sup>	do .....	do .....	do .....	do .....			
	411	Vermont.....	Charlotte .....	C. G. Pringle .....	Moist.....			
	1035	Massachusetts.....	Danvers .....	J. Robinson .....	Gravelly.....	0.197	17	7
319. <i>Populus grandidentata</i> .....	157	Vermont.....	Charlotte .....	C. G. Pringle .....	Sandy loam .....			
	847	Massachusetts.....	Danvers .....	J. Robinson .....	Gravelly.....	0.220	41	
320. <i>Populus heterophylla</i> ..... <i>River Cottonwood. Swamp Cottonwood.</i>	522	Tennessee.....	Nashville .....	A. Gattinger .....	Alluvial .....			
	554	Alabama.....	Stockton.....	C. Mohr .....	do .....			
321. <i>Populus balsamifera</i> ..... <i>Balsam. Tacamahac. Balm of Gilead.</i>	159	Vermont.....	Shelburne .....	C. G. Pringle .....	Sandy loam .....			
	961	Alaska .....	Chilcoot inlet.....	Paul Schultze.....	Alluvial .....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4326	0.4545	0.4319	0.4397	0.40	0.50	0.50	27.40		1143
0.4030 0.4434	0.4184 0.4043		0.4548	0.48	0.49	0.49			859
			0.3974	0.36	0.37	0.37			1225
			0.4261			0.43	26.55		
0.4012	0.5081		0.4997	0.70	0.68	0.74			641
0.5234	0.4958		0.5094	0.36	0.42	0.39			721
0.4023	0.4707		0.4815	0.67	0.72	0.70			888
			0.4969			0.61	30.97		
0.5920	0.5504		0.5412	0.43	0.34	0.39	33.73		972
0.5471	0.5220		0.5350	0.33	0.32	0.32	33.34		966
0.5750	0.5633		0.5716	0.49	0.44	0.47			1175
0.6393	0.6450		0.6422	0.72	0.71	0.72			1180
			0.6009			0.50	37.32		
0.5704	0.5323	0.5734	0.5587	1.01	0.95	0.98	34.32		609
0.5011	0.5133		0.5072	0.67	0.52	0.50	31.61		1161
0.3785			0.3785	0.76		0.76		All sap-wood	272 <sup>1</sup>
0.3579			0.3579	0.72		0.72		All sap-wood	272 <sup>2</sup>
0.3560			0.3560					All sap-wood	272 <sup>3</sup>
0.4880	0.5021		0.4951	0.31	0.31	0.31		All sap-wood	411
0.4184 0.4227	0.4255 0.4446		0.4278	0.43	0.39	0.41		All sap-wood	1035
			0.4032			0.55	25.13		
0.5119	0.4372		0.4996		0.43	0.43		All sap-wood	157
0.4205	0.4416	0.4182	0.4268	0.45	0.47	0.46		All sap-wood	847
			0.4632			0.45	28.87		
0.4023	0.4113		0.4068	0.74	0.70	0.72		All sap-wood	522
0.4115	0.4105		0.4110	0.90	0.90	0.90			554
			0.4039			0.81	25.48		
0.3524	0.3404		0.3464	1.12	0.72	0.92		All sap-wood	159
0.3343	0.3763		0.3306	0.39	0.40	0.40			903
			0.3635			0.66	22.65		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
321. <i>Populus balsamifera</i> , var. <i>candicans</i> .....	1054	Massachusetts.....	Topsfield .....	J. Robinson .....	Gravelly .....	0.208	11	10
322. <i>Populus angustifolia</i> .....	552	Colorado .....	Manitou Springs.....	Robert Douglas.....	Sandy loam .....	0.098	10	11
323. <i>Populus trichocarpa</i> .....	1012	Oregon .....	Saint John's Barrel .....	F. Skinner .....	.....	.....	.....	.....
<i>Black Cottonwood. Balsam Cottonwood.</i>	1028	.....do .....	Factory, Portland, .....	G. Engelmann and .....	.....	.....	.....	.....
.....	.....	.....	Portland Furniture .....	C. S. Sargent.	.....	.....	.....	.....
.....	.....	.....	Company.	.....	.....	.....	.....	.....
324. <i>Populus monilifera</i> .....	199	Ohio .....	Barney and Smith .....	E. E. Barney .....	.....	.....	.....	.....
<i>Cottonwood. Necklace Poplar. Caro-</i>	234	Vermont.....	Manufacturing Co. .....	C. G. Pringle .....	Alluvial .....	.....	.....	.....
<i>lina Poplar. Big Cottonwood.</i>	255	Missouri.....	Charlotte .....	G. W. Letterman.....	do .....	.....	.....	.....
.....	304	.....do .....	Allenton .....	do .....	do .....	.....	.....	.....
.....	309	Texas .....	do .....	do .....	do .....	0.806	5	50
.....	754	Florida .....	Dallas .....	J. Reverchon .....	do .....	0.250	20	.....
.....	.....	.....	Chattahoochee .....	A. H. Curtiss .....	do .....	.....	.....	.....
325. <i>Populus Fremontii</i> .....	650	California.....	Sacramento valley .....	G. R. Vasey .....	do .....	0.444	16	10
<i>Cottonwood.</i>	.....	.....	.....	.....	.....	.....	.....	.....
325. <i>Populus Fremontii</i> , var. <i>Wislizeni</i> .....	646	do .....	San Bernardino .....	W. G. Wright.....	do .....	.....	.....	.....
<i>Cottonwood. White Cottonwood.</i>	.....	.....	.....	.....	.....	.....	.....	.....
CONIFERÆ.								
326. <i>Libocedrus decurrens</i> .....	579	do .....	Saw-mill, Straw- .....	G. Engelmann and .....	.....	.....	.....	.....
<i>White Cedar. Bastard Cedar. Post</i>	634	do .....	berry valley. .....	C. S. Sargent.	do .....	.....	.....	.....
<i>Cedar. Incense Cedar.</i>	662	do .....	do .....	do .....	.....	.....	.....	.....
.....	.....	.....	Saw-mill, San Ber- .....	W. G. Wright.....	.....	.....	.....	.....
.....	.....	.....	nardino mountains.	.....	.....	.....	.....	.....
327. <i>Thuja occidentalis</i> .....	104	Vermont.....	Monkton .....	C. G. Pringle.....	Cold, peaty .....	.....	.....	.....
<i>White Cedar. Arbor-vitæ.</i>	379	do .....	do .....	do .....	do .....	.....	.....	.....
.....	782	New Brunswick .....	.....	.....	.....	.....	.....	.....
.....	783	do .....	.....	.....	.....	.....	.....	.....
.....	780	Province of Quebec .....	Bridgeton .....	Ed. Sinclair.....	.....	.....	.....	.....
.....	792	do .....	.....	.....	.....	.....	.....	.....
.....	796	do .....	.....	.....	.....	.....	.....	.....
.....	874	Maine .....	Mattawankeag.....	J. Robinson.....	.....	0.172	19	71
.....	1009	Wisconsin .....	Eau Claire.....	H. C. Putnam .....	Drift .....	.....	.....	.....
328. <i>Thuja gigantea</i> .....	1017	Oregon .....	Weidler's saw-mill, .....	G. Engelmann and .....	.....	.....	.....	.....
<i>Red Cedar. Canoe Cedar.</i>	1021	do .....	Portland, .....	C. S. Sargent.	do .....	.....	.....	.....
.....	.....	.....	Portland Furniture .....	.....	.....	.....	.....	.....
.....	.....	.....	Company.	.....	.....	.....	.....	.....
329. <i>Chamaecyparis sphaeroloba</i> .....	350	Alabama.....	Cottage Hill .....	C. Mohr.....	Sandy, wet .....	0.298	7	20
<i>White Cedar.</i>	350	Massachusetts.....	Beverly .....	J. Robinson.....	Swampy .....	.....	.....	.....
.....	351	do .....	do .....	do .....	do .....	.....	.....	.....
.....	352	do .....	do .....	do .....	do .....	.....	.....	.....

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.3959	0.4222	0.4301	0.4161	0.48	0.43	0.46	25.03	Cultivated. First and second sp. gr. determinations made on sap-wood.	1054
0.3942	0.3881		0.3912	0.82	0.75	0.79	24.38		552
0.3511	0.3656	0.3507	0.3578	1.47	0.87	1.17		Third sp. gr. determination made on sap-wood.	1012
0.4168	0.3937		0.4050	1.56	1.18	1.37			1028
			0.3814			1.27	23.77		
0.3817	0.3946		0.3882	1.34	1.43	1.39			199
0.3939	0.3902		0.3921	0.68	0.94	0.81			234
0.3815	0.3444		0.3380	1.18	0.92	1.05			255
0.3201	0.3231		0.3216	0.83	0.79	0.81			304
0.4700	0.4778		0.4742	1.09	0.90	1.03			309
0.4355	0.4632		0.4404	0.69	0.60	0.65			754
			0.3889			0.96	24.24		
0.5490	0.4055	0.4597	0.4914	0.77		0.77	30.02	All sap-wood	659
0.4827	0.4176	0.4860	0.4621	1.17	1.09	1.13	28.80		646
0.3891	0.3830		0.3861	0.03	0.04	0.04			579
0.3428	0.3700		0.3599	0.13	0.17	0.15			634
0.4586	0.4590		0.4591	0.08	0.05	0.06			662
			0.4017			0.08	25.08		
0.3048	0.3021		0.3035	0.29	0.25	0.27			104
0.2847	0.2870		0.2859	0.20	0.29	0.29			379
0.3284	0.3275		0.3280	0.49	0.51	0.50			782
0.3163	0.3275	0.3272	0.3237	0.39	0.44	0.42			783
0.3016	0.3007		0.3012	0.29	0.31	0.30			790
0.3452	0.2880		0.3166	0.36	0.44	0.40			792
0.3108	0.3104		0.3106	0.43	0.37	0.40			796
0.3584	0.3529	0.3607	0.3603	0.39	0.34	0.37			874
0.3121	0.3232		0.3177	0.37	0.38	0.38			1099
			0.3164			0.37	19.72		
0.3996	0.4178		0.4087	0.12	0.14	0.13			1017
0.3460	0.3551		0.3506	0.24	0.19	0.22			1021
			0.3706			0.17	23.66		
0.3337	0.3447		0.3392	0.94	0.90	0.92			350
0.3105	0.3644	0.3081	0.3277	0.17	0.15	0.16			359
0.3038	0.3036	0.3182	0.3085	0.18	0.11	0.12			351
0.2990	0.3091	0.4527	0.3536	0.11	0.13	0.12			352
			0.3322			0.33	20.70		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
330. <i>Chamaecyparis Nutkaensis</i> ..... <i>Yellow Cypress. Sitka Cypress.</i>	980	Alaska .....	Sitka .....	Paul Schultze .....				
	983	British Columbia .....	Saw-mill, Victoria .....	G. Engelmann and C. S. Sargent .....				
	994	Alaska .....	Peril strait .....	Paul Schultze .....				
	1000	do .....	Weidler's saw-mill, Portland, Oregon .....	G. Engelmann and C. S. Sargent .....				
331. <i>Chamaecyparis Lawsoniana</i> ..... <i>Port Orford Cedar. Oregon Cedar. White Cedar. Lawson's Cypress. Ginger Pine.</i>	701	Oregon .....	Dean & Co.'s saw-mill, Marshfield .....	do .....				
	707	do .....	do .....	do .....				
332. <i>Cupressus macrocarpa</i> ..... <i>Monterey Cypress.</i>	675	California .....	Monterey .....	do .....	Gravelly loam .....			
333. <i>Cupressus Goveniana</i> .....	691	do .....	Marin county .....	G. R. Vasey .....	Dry ridges .....	0.283	95	
	1100	do .....	Calistoga .....	W. F. Fisher .....	do .....	0.284	30	
335. <i>Cupressus Guadalupeensis</i> .....	798	Eastern Arizona .....	San Francisco mountains .....	E. L. Greene .....	Rocky .....			
	1149	Arizona .....	Santa Catalina mountains .....	C. G. Pringle .....	do .....			
336. <i>Juniperus Californica</i> ..... <i>Juniper.</i>	1229	California .....	San Bernardino county .....	do .....	Gravelly .....			
336. <i>Juniperus Californica, var. Utahensis</i> .. <i>Juniper.</i>	887	Utah .....	Lewiston .....	M. E. Jones .....	do .....	0.072	55	12
337. <i>Juniperus pachyphloea</i> ..... <i>Juniper.</i>	555	New Mexico .....	Silver City .....	E. L. Greene .....	Stony .....			
	592	Arizona .....	Santa Rita mountains .....	G. Engelmann and C. S. Sargent .....	Gravelly .....			
	692	do .....	do .....	do .....	do .....			
338. <i>Juniperus occidentalis</i> ..... <i>Juniper.</i>	624	California .....	Yreka plains .....	do .....	do .....			
338. <i>Juniperus occidentalis, var. monosperma</i> .. <i>Juniper.</i>	420	New Mexico .....	Silver City .....	E. L. Greene .....	Stony .....	0.175	22	04
	527	Colorado .....	Manitou Springs .....	Robert Douglas .....	Gravelly .....			
338. <i>Juniperus occidentalis, var. conjugens</i> .. <i>Juniper.</i>	939	Texas .....	Austin .....	C. Mohr .....	Limestone .....	0.184	23	28
	1102	do .....	do .....	S. B. Buckley .....	do .....			
339. <i>Juniperus Virginiana</i> ..... <i>Red Cedar. Savin.</i>	14	Massachusetts .....	Arnold Arboretum .....	C. S. Sargent .....	Drift .....	0.230	10	40
	327	Texas .....	Dallas .....	J. Reverchon .....	Calcareous .....	0.484	16	66
	784	Florida .....	Chattahoochee .....	A. H. Curtiss .....	do .....			
	800	do .....	Saint John's river .....	do .....	Sandy loam .....			
	837	Massachusetts .....	Danvers .....	J. Robinson .....	Drift .....			
	924	Florida .....	Chattahoochee .....	C. Mohr .....	Alluvial .....			
	1055	Massachusetts .....	Topsfield .....	J. Robinson .....	Drift .....	0.203	15	97

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4011	0.4484		0.4248	0.30	0.37	0.34		969	
0.4987	0.5010		0.4990	0.29	0.34	0.32		983	
0.5356	0.5106		0.5201	0.20	0.34	0.32		994	
0.4555	0.4686		0.4621	0.30	0.30	0.38		1000	
			0.4782			0.34	20.80		
0.4850	0.4487		0.4422	0.07	0.12	0.10		701	
0.4380	0.5259		0.4819	0.08	0.09	0.09		707	
			0.4621			0.10	28.80		
0.6260	0.6203		0.6201	0.55	0.59	0.57	39.02	675	
0.4492	0.4733		0.4613	0.41	0.35	0.38		681	
0.4620	0.4910		0.4765	0.54	0.47	0.51		1100	
			0.4689			0.45	20.22		
0.4048	0.4648	0.4617	0.4086	0.43	0.38	0.41		All sap-wood..... 798	
0.4826	0.5272		0.5049	0.41	0.51	0.40		1149	
			0.4843			0.44	30.18		
0.6300	0.6255		0.6282	0.77	0.73	0.75	39.15	1229	
0.5504	0.5539		0.5522	0.47	0.51	0.49	34.41	0.8 sap-wood..... 887	
0.5744	0.6965		0.6355	0.11	0.16	0.14		555	
0.5085	0.5619	}	0.5302	{	0.07	0.07	0.08	One tree.....	592
0.5185	0.5321								
			0.5829			0.11	36.32		
0.5724	0.5807		0.5765	0.12	0.12	0.12	35.93	624	
0.7320	0.7440		0.7385	0.68	0.68	0.68		420	
0.6708	0.6935		0.6852	0.89	0.86	0.88		527	
			0.7119			0.78	44.26		
	0.6967		0.6967	0.45	0.47	0.46		930	
0.6750	0.6840	0.6948	0.6846	0.39	0.53	0.46		1102	
			0.6907			0.46	43.04		
0.5112	0.5045		0.5079	0.15	0.14	0.14		0.1 sap-wood..... 14	
0.4585	0.4408		0.4539	0.12	0.14	0.13		327	
0.5455	0.5310	0.5533	0.5433	0.16	0.17	0.16		734	
0.4901	0.4727		0.4814	0.13	0.08	0.11		800	
0.4804	0.4608	0.4733	0.4743	0.16	0.14	0.15		837	
0.4888	0.4705	0.4740	0.4761	0.16	0.12	0.14		924	
0.5290	0.4937	0.5107	0.5111	0.09	0.09	0.09		1055	
			0.4926			0.13	30.70		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
340. <i>Taxodium distichum</i> <i>Bald Cypress. Black Cypress. Red Cypress. White Cypress. Deciduous Cypress.</i>	535	Alabama	Stockton	C. Mohr	Alluvial			
	542	do	Otis & Co., saw-mill.	do	do			
	543	do	do	do	do			
	581	Arkansas	Little Rock	G. W. Letterman	do			
	582	do	do	do	do			
	741	Florida	Chattahoochee	A. H. Curtiss		0.514	55	280
	894 <sup>1</sup>			Department of Agriculture.				
	894 <sup>2</sup>			do				
	923	Alabama	Stockton	C. Mohr	Alluvial			
	1212			do				
1213			do					
1214	Louisiana	Bayou La Battery	do	Alluvial				
341. <i>Sequoia gigantea</i> <i>Big Tree.</i>	657	California	Tulare county	G. Engelmann and C. S. Sargent.	Granite			
	666	do	do	do	do			
342. <i>Sequoia sempervirens</i> <i>Redwood.</i>	673	do	Russian river	C. S. Sargent.				
	710	do	Santa Cruz	Turner, Kennedy & Shaw.				
	711 <sup>1</sup>	do	do	do				
	711 <sup>2</sup>	do	do	do				
	712	do	Mendocino county	J. Kentfield & Co.				
	713	do	do	do				
	714	do	do	do				
	715	do	do	do				
343. <i>Taxus brevifolia</i> <i>Yew.</i>	978	Oregon	Portland	G. Engelmann and C. S. Sargent.	Moist, rich	0.279	8	46
344. <i>Taxus Floridae</i> <i>Yew.</i>	305	Florida	Flat Creek	A. H. Curtiss	Sandy loam			
345. <i>Torreya taxifolia</i> <i>Stinking Cedar. Savin.</i>	62	do	Chattahoochee	C. S. Sargent.	Alluvial			
	277	do	do	A. H. Curtiss	Calcareous	0.284	12	78
346. <i>Torreya Californiae</i> <i>California Nutmeg. Stinking Cedar.</i>	651	California	Marin county	G. R. Vasey	Stony	0.361	26	73
347. <i>Pinus Strobus</i> <i>White Pine. Weymouth Pine.</i>	1	Massachusetts	Arnold Arboretum	C. S. Sargent	Drift	0.510	10	51
	164	Michigan	Woodsum Machine Company.	E. E. Barney				
	208	do	Barney & Smith Manufacturing Co.	do				
	222	Vermont	Charlotte	C. G. Pringle	Wet, swampy			
	723	Pennsylvania	Williamsport	do				
	777	New Brunswick		Intercolonial railway.				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Thrd.	Average.	First.	Second.	Average.			
0.4550	0.4442		0.4501	0.44	0.40	0.43			536
0.5114	0.4890		0.5005	0.35	0.31	0.33		White cypress	542
0.5017	0.5224		0.5121	0.60	0.52	0.59		Black cypress	543
0.4083	0.4545		0.4614	0.38	0.45	0.42			581
0.4083	0.5031		0.4857	0.34	0.29	0.32			582
0.4159	0.4004	0.3808	0.4020	0.27	0.30	0.29		White cypress sap-wood	741
0.2444	0.2019			0.56				Butt of knee	804 <sup>1</sup>
0.2302	0.2304			0.55				Top of knee	804 <sup>2</sup>
0.3442	0.3056							{ From opposite sides of center of tree next to heart. Next outside of preceding..... } One tree. { .....do ..... } { Outside of tree..... }	
0.4282	0.3705		0.4072	0.39		0.44			
0.4599	0.5022			0.48					
0.4112	0.4328	0.3492							
0.3800	0.3750		0.3805	0.50	0.50	0.50		Outside wood	} One tree: White cypress
0.4128	0.4037		0.4540	0.51	0.53	0.52		Heart-wood	
0.4878	0.4904		0.4891	0.36	0.37	0.37		Black cypress	1214
			0.4543			0.42	27.65		
0.3234	0.3202		0.3210	0.54	0.50	0.44			657
0.3226	0.3280			0.41	0.38				
0.3624	0.2523		0.2534	0.50	0.04	0.57		All sap-wood	666
			0.2882			0.50	18.20		
0.3783	0.3005		0.3377	0.12	0.23	0.17			675
0.4242	0.4281		0.4262	0.16	0.19	0.18		Wood from top of tree	710
0.3009	0.4444		0.4204	0.11		0.11		Wood from butt of tree	711 <sup>1</sup>
0.4012	0.4592		0.4787	0.14		0.14		Wood from butt of tree	711 <sup>2</sup>
0.3015	0.2882		0.2900	0.06	0.11	0.09			712
0.3010	0.3012		0.3011	0.18	0.16	0.17			718
0.5226	0.4714		0.4970	0.17	0.16	0.17			714
0.4827	0.5181		0.5004	0.10	0.18	0.12		Wood with curled grain	715
			0.4208			0.14	26.22		
0.6360	0.6559	0.6230	0.6381	0.22	0.22	0.22	30.83		978
0.6340			0.6340	0.20	0.22	0.21	30.51		305
0.6034	0.5308		0.5702	1.08	1.38	1.23			62
0.4728	0.4447		0.4588	0.25	0.21	0.23			277
			0.5145			0.73	32.00		
0.4823	0.4606		0.4700	1.27	1.40	1.34	20.00		651
0.3040	0.4106		0.4026	0.11	0.10	0.15			1
0.3481	0.3450		0.3470	0.13	0.17	0.15			184
0.3400	0.3418		0.3400	0.22	0.20	0.21			208
0.4880	0.6401		0.5670	0.23	0.21	0.22			222
0.3000	0.3850		0.3770	0.18	0.12	0.15			723
0.3000	0.3140		0.3073	0.23	0.30	0.26			777

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
347. <i>Pinus Strobus</i> —continued .....	788	New Brunswick	Bridgeton .....	Ed. Sinclair .....				
	789	Province of Quebec.	Amqui .....	A. Grant .....				
	797	do	.....	Grank Trunk railway.				
	1044	Massachusetts	Reading .....	J. Robinson .....	Drift .....	0.215	15	16
348. <i>Pinus monticola</i> .....	975	British Columbia	Hasting's saw-mill, Burrard inlet.	G. Engelmann and C. S. Sargent.				
	987	Oregon	Cascade mountains	C. S. Sargent.	Moist loam			
349. <i>Pinus Lambertiana</i> .....	638	California	Saw-mill, Strawberry valley.	G. Engelmann and C. S. Sargent.				
	668	do	.....	G. R. Vasey .....				
	780	do	Lassen's peak .....	Sierra Lumber Company, San Francisco.				
350. <i>Pinus flexilis</i> .....	819	Colorado	Forest City .....	T. S. Brandegee .....	Gravelly .....	0.502	38	120
	913	Nevada	Monitor range .....	A. Triple .....	do .....			
351. <i>Pinus albicaulis</i> .....	992	British Columbia	Silver Mountain valley, Fraser river.	G. Engelmann and C. S. Sargent.		0.494	50	160
352. <i>Pinus reflexa</i> .....	597	Arizona	Santa Rita mountains.	do .....	Rocky .....			
	802	New Mexico	Pinos Altos mountains.	E. L. Greene .....				
	601	Arizona	Santa Rita mountains.	G. Engelmann and C. S. Sargent.				
353. <i>Pinus Parryana</i> .....	656	California	San Diego county .....	G. R. Vasey .....				
354. <i>Pinus cembroides</i> .....	1226	Arizona	Santa Catalina mountains.	C. G. Pringle .....				
355. <i>Pinus edulis</i> .....	397	Colorado	Cañon City .....	E. Weston .....	Gravelly .....	0.284	30	79
356. <i>Pinus monophylla</i> .....	823	Eastern Arizona	San Francisco mountains.	E. L. Greene .....	do .....			
	882	Utah	Lewiston .....	M. E. Jones .....	Rocky .....	0.164	19	66
	891	Eastern Arizona	San Francisco mountains.	E. L. Greene .....				
	900	California	.....	Department of Agriculture.				
	915	Nevada	Danville .....	A. Triple .....	Gravelly .....			
357. <i>Pinus Balfouriana</i> .....	577	California	Scott mountains .....	G. Engelmann and C. S. Sargent.	Rocky .....	0.368	75	309
	631	.....	.....	.....				
357. <i>Pinus Balfouriana, var. aristata</i> .....	821	Colorado	Forest City .....	T. S. Brandegee .....		0.450	44	186
	914	Nevada	Prospect mountain .....	A. Triple .....	Rocky .....			
358. <i>Pinus resinosa</i> .....	194	Michigan	Barney & Smith Manufacturing Co.	E. E. Barney .....				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.3091	0.3070		0.3080	0.20		0.20		788	
0.3024	0.3403		0.3543	0.19	0.19	0.19		789	
0.3005	0.3725		0.3815	0.21	0.22	0.21		707	
0.3503	0.3513	0.3438	0.3485	0.10	0.13	0.12		1044	
			0.3854			0.19	24.02		
0.4201	0.4102		0.4197	0.20	0.28	0.27		975	
0.3084	0.3654		0.3619	0.15	0.21	0.18		987	
			0.3008			0.23	24.35	Cut at 3,800 feet elevation	
0.4060	0.4014		0.4040	0.17	0.16	0.17		638	
0.3782	0.3889		0.3885	0.29	0.25	0.27		608	
0.3153	0.3201		0.3177	0.22	0.24	0.23		730	
			0.3084			0.22	22.90		
0.4005	0.4031	0.4526	0.4507	0.20	0.20	0.20		819	
0.4200			0.4200	0.35		0.35		913	
			0.4358			0.28	27.10	Second sp. gr. determination made on sap-wood. Cut at elevation of 10,000 feet. All sap-wood.	
0.4233	0.4097		0.4105	0.30	0.23	0.27	25.90		
0.4720	0.5253	0.5052	0.4971	0.24	0.24	0.24		597	
0.4086	0.4061	0.4847	0.4783	0.27	0.20	0.20		602	
0.4860	0.4000		0.4783	0.30	0.27	0.28		661	
			0.4877			0.26	30.30		
0.5028	0.5721		0.5075	0.54		0.54	35.37		
0.6005	0.6330		0.6512	0.88	0.92	0.90	40.68		
0.5813	0.6903		0.6388	0.57	0.68	0.62	39.81	Second sp. gr. specimen contained a knot	
0.6000	0.5603		0.5781	0.78	0.65	0.71		823	
0.4490	0.4044		0.4572	0.67	0.77	0.72		882	
0.6140	0.7617		0.6878	0.72	0.72	0.72		891	
0.5715	0.5230		0.5473	0.89	0.76	0.83		900	
0.5585			0.5585	0.41		0.41		915	
			0.5658			0.68	35.26		
0.5434	0.5400	0.5273	0.5434	0.41	0.41	0.40	33.86	One tree	
0.5580	0.5476			0.38	0.42			631	
0.4097	0.5319	0.4071	0.4096	0.18	0.13	0.18		821	
0.6140			0.6140	0.42		0.42		914	
			0.5572			0.30	34.72	Third sp. gr. determination made on sap-wood. 0.75 sap-wood	
0.4872	0.4638		0.4855	0.23	0.13	0.20		194	

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
358. <i>Pinus resinosa</i> —continued.	315	Michigan	Hersey	W. J. Beal				
	413	Vermont	Charlotte	C. G. Pringle	Clay			
	779	New Brunswick		Intercolonial rail- way.				
	785	do	Bridgeton	Ed. Sinclair				
	1074	Vermont	Charlotte	C. G. Pringle				
	1075	do	do	do				
	1076	do	do	do				
359. <i>Pinus Torreyana</i>	906	California	San Diego county	G. Engelmann	Sandy	0.234	82	8
360. <i>Pinus Arizona</i> <i>Yellow Pine.</i>	1144	Arizona	Santa Rita mount- ains.	C. G. Pringle	Rocky			
	1154	do	do	do	do			
	1155	do	do	do	do			
	1156	do	do	do	do			
361. <i>Pinus ponderosa</i> <i>Yellow Pine. Bull Pine.</i>	619	Dakota	Deadwood	Robert Douglas	Gravelly			
	626	Oregon	Saw-mill, Ashland	G. Engelmann and C. S. Sargent.				
	630	California	Strawberry valley	do	Low, wet, swampy			
	632	do	do	do				
	636	Oregon	Saw-mill, Ashland	do				
	689	California	Saw-mill, San Ber- nardino.	W. G. Wright				
	718	Montana	Saw-mill, Missoula	S. Watson				
	731	California	Lassen's peak	Sierra Lumber Com- pany.				
	907	Colorado	Cañon City	E. Weston				
	910	do	do	do				
1007	California	Saw-mill, San Ber- nardino.	W. G. Wright					
362. <i>Pinus Jeffreyi</i> <i>Bull Pine. Black Pine.</i>	578	do	Scott mountains	G. Engelmann and C. S. Sargent.	Dry, gravelly			
	633	do	do	do	do			
	667	California	Saw-mill, San Ber- nardino.	W. G. Wright				
363. <i>Pinus Chihuahuana</i>	593	Arizona	Santa Rita mount- ains.	G. Engelmann and C. S. Sargent.	Dry, gravelly	0.510	102	53
	604	do	do	do	do			
364. <i>Pinus contorta</i> <i>Scrub Pine.</i>	997	British Columbia	Vancouver's island	G. Engelmann and C. S. Sargent.	do			
365. <i>Pinus Murrayana</i> <i>Tamarack. Black Pine. Lodge-pole Pine. Spruce Pine.</i>	293	Colorado	Forest City	T. S. Brandegee	Moist, sandy loam	0.269	43	23
	563	do	do	C. S. Sargent	do			
	625	California	Scott mountains	G. Engelmann and C. S. Sargent.	do			
366. <i>Pinus Sabiniana</i> <i>Digger Pine. Bull Pine.</i>	571	do	Jolon	G. R. Vasey				
	644	do	Contra Costa county	do	Gravelly	0.312	43	

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5450	0.5416		0.5433	0.20	0.24	0.22			315
0.5121	0.4587		0.4829	0.24	0.24	0.24		All sap-wood	418
0.4555	0.4911		0.4733	0.28	0.29	0.29		All sap-wood	779
0.4250	0.4631		0.4441	0.39	0.34	0.37			785
0.4627	0.4752	0.5227	0.4869	0.28	0.27	0.27		All sap-wood	1074
0.4931	0.4922	0.4845	0.4890	0.26	0.29	0.28		First and third sp. gr. determinations made on 0.5 sap-wood; second sp. gr. determination made on sap-wood.	1075
0.4892	0.4582	0.4858	0.4777	0.24	0.31	0.28		Second sp. gr. determination made on 0.5 sap-wood; third sp. gr. determination made on sap-wood.	1076
			0.4854			0.27	30.25		
0.4659	0.5119	0.4860	0.4879	0.38	0.33	0.35	30.40	First and second sp. gr. determinations made on sap-wood	998
0.5860	0.5079		0.5220	0.14	0.15	0.14			1144
0.5066	0.7844		0.6455	0.21	0.20	0.20		Second sp. gr. specimen very resinous	1154
0.4567	0.4204	0.4011	0.4461	0.19	0.26	0.23			1155
0.4168	0.3964		0.4016	0.25	0.24	0.24			1156
			0.5038			0.20	31.40		
0.4877	0.4818		0.4845	0.27	0.26	0.27			619
0.4552	0.4410		0.4485	0.38	0.41	0.40		All sap-wood	626
0.4571	0.4152		0.4362	0.38	0.36	0.37		All sap-wood	630
0.5264	0.5350		0.5307	0.31	0.30	0.30		All sap-wood	632
0.4184	0.4240		0.4212	0.34	0.43	0.39		All sap-wood	636
0.5144	0.5205		0.5204	0.23	0.23	0.23			689
0.3072	0.4470		0.4225	0.40	0.36	0.38			718
0.4284	0.4497		0.4360	0.28	0.25	0.27		All sap-wood	781
0.4676	0.5805		0.4900	0.58	0.40	0.49		All sap-wood	907
0.4370	0.4459		0.4417	0.45	0.45	0.45		All sap-wood	910
0.5521	0.5412		0.5406	0.30	0.38	0.32		All sap-wood	1007
			0.4715			0.35	29.45		
0.4561	0.4520			0.22	0.20			One tree. Fourth sp. gr. determination made on 0.5 sap-wood.	578
0.4985	0.5075		0.4785	0.23	0.36	0.25			633
0.5082	0.5274		0.5628	0.29	0.24	0.27			All sap-wood
			0.5206			0.26	32.44		
0.5584	0.5780	0.5750	0.5457	0.37	0.37	0.39	34.01	One tree	593
0.5226	0.5239		0.41						0.40
0.5709	0.5985	0.5750	0.5815	0.21	0.16	0.19	36.24		997
0.3550	0.3551		0.3551	0.36	0.29	0.33			293
0.4291	0.4267		0.4279	0.26	0.25	0.26			563
0.4204	0.4711		0.4457	0.37	0.37	0.37			625
			0.4096			0.32	25.53		
0.4528	0.4531		0.4530	0.48	0.41	0.42		All sap-wood	571
0.4988	0.5912		0.5150	0.40	0.35	0.37		All sap-wood	644
			0.4840			0.40	30.16		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
367. <i>Pinus Coulteri</i> .....	1157	California.....	San Bernardino.....	W. G. Wright.....	Dry, gravelly.....			
368. <i>Pinus insignis</i> ..... <i>Monterey Pine.</i>	676	do.....	Monterey.....	G. R. Vasey.....	Gravelly loam.....	0.544	35	
	896	do.....		Department of Agriculture.				
369. <i>Pinus tuberculata</i> ..... <i>Knob-cone Pine.</i>	576	do.....	Mount Shasta.....	G. Engelmann and C. S. Sargent.	Gravelly.....	0.418	35	18
370. <i>Pinus Taeda</i> ..... <i>Loblolly Pine. Old-field Pine. Rosemary Pine.</i>	82	Florida.....	Duval county.....	A. H. Curtiss.....	Moist, sandy.....	0.034	27	6
	355	Alabama.....	Cottage Hill.....	C. Mohr.....	Low, rich.....			
	388	North Carolina.....	Wilmington.....	Edward Kidder.....	Loam.....			
	389	do.....	do.....	do.....	do.....			
371. <i>Pinus rigida</i> ..... <i>Pitch Pine.</i>	13	Massachusetts.....	Arnold Arboretum.....	C. S. Sargent.....	Drift.....	0.267	21	15
	1046	do.....	North Reading.....	J. Robinson.....	do.....	0.230	26	8
372. <i>Pinus serotina</i> ..... <i>Pond Pine.</i>	83	Florida.....	Duval county.....	A. H. Curtiss.....	Moist, sandy loam.....	0.312	33	19
373. <i>Pinus inops</i> ..... <i>Jersey Pine. Scrub Pine.</i>	621	South Carolina.....	Aiken.....	H. W. Ravenel.....	Dry, sandy.....	0.206	8	42
	622	do.....	do.....	do.....	do.....	0.164	28	84
	1169	Indiana.....	New Albany.....	M. J. Robinson.....				
	1172	New Jersey.....	Mount Holly.....	S. P. Sharples.....				
374. <i>Pinus clausa</i> ..... <i>Sand Pine. Scrub Pine. Spruce Pine.</i>	279	Florida.....	Apalachicola.....	A. H. Curtiss.....	Dry, sandy barrens.....	0.238	6	36
375. <i>Pinus pungens</i> ..... <i>Table-mountain Pine. Hickory Pine.</i>	321	Virginia.....	Wytheville.....	H. Shriver.....	Clay.....	0.264	20	35
	396	Pennsylvania.....	Colerain Forge.....	J. R. Lowrie.....	Slate.....	0.010	14	
376. <i>Pinus muricata</i> ..... <i>Obispo Pine. Bishop's Pine.</i>	671	California.....	Marin county.....	G. R. Vasey.....	Gravelly.....	0.243	20	
377. <i>Pinus mitis</i> ..... <i>Yellow Pine. Short-leaved Pine. Spruce Pine. Bull Pine.</i>	278	Florida.....	Chattahoochee.....	A. H. Curtiss.....	Clay.....	0.015	33	
	319	Louisiana.....	Amite.....	C. Mohr.....	Sandy loam.....			
	557	Arkansas.....	Texarkana.....	F. L. Harvey.....	do.....			
	558	do.....	do.....	do.....	do.....			
	559	do.....	do.....	do.....	do.....			
378. <i>Pinus glabra</i> ..... <i>Cedar Pine. Spruce Pine. White Pine.</i>	142	South Carolina.....	Bonneau's Depot.....	H. W. Ravenel.....	Rich upland.....			
	544	Mississippi.....	Gainesville.....	C. Mohr.....	Low, sandy.....			
	764	Florida.....	Chattahoochee.....	A. H. Curtiss.....	Low, wet.....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4272	0.3904		0.4133	0.34	0.40	0.37	25.76	All sap-wood.....	1157
0.4052	0.5244		0.5098	0.25	0.20	0.23			676
0.4082	0.4018		0.4050	0.34	0.37	0.36			896
			0.4574			0.30	28.50		
0.3469	0.3529		0.3499	0.36	0.30	0.33	21.81		576
0.5610	0.5609		0.5609	0.26	0.29	0.27		All sap-wood.....	82
0.5788	0.5460		0.5627	0.25	0.26	0.26		All sap-wood.....	355
0.5458	0.5054		0.5556	0.28	0.28	0.27		Rosemary pine.....	388
0.5045	0.4896		0.4971	0.27	0.23	0.25		All sap-wood.....	389
			0.5441			0.26	33.91		
0.5597	0.5609		0.5638	0.19	0.21	0.20		All sap-wood.....	13
0.4065	0.4154	}	0.4068	}	0.32	0.26		{ First sp. gr. determination made on sap-wood; second and third sp. gr. determinations made on 0.5 sap-wood. Fourth sp. gr. specimen very resinous.	1046
0.4181	0.6823								
			0.5151			0.23	32.10		
0.7904	0.7981	0.7900	0.7942	0.15	0.18	0.17	49.49		83
0.4905	0.4830		0.4867	0.24	0.27	0.26		All sap-wood.....	621
0.5571	0.5680		0.5626	0.32	0.31	0.32			622
0.5149	0.4003		0.4876	0.32	0.23	0.28		All sap-wood.....	1169
0.5778	0.5841	0.5991	0.5870	0.29	0.34	0.32			1172
			0.5309			0.30	38.09		
0.4696	0.0456		0.5576	0.30	0.31	0.31	34.75		279
0.5235	0.5050		0.5143	0.30	0.30	0.30			321
0.4851	0.4602		0.4727	0.24	0.22	0.23			396
			0.4935			0.27	30.75		
0.5054	0.4881		0.4942	0.26	0.25	0.26	30.80	Second sp. gr. determination made on sap-wood.....	671
0.5739	0.4550		0.5144	0.35	0.35	0.35		All sap-wood.....	278
0.7098	0.7569		0.7333	0.22	0.22	0.22		0.5 sap-wood.....	319
0.6086	0.6129		0.6107	0.23	0.17	0.20			557
0.7262	0.7232		0.7247	0.33	0.31	0.32			558
0.4689	0.4689		0.4689	0.32	0.41	0.37		All sap-wood.....	559
			0.6104			0.20	38.04		
0.4358	0.4235		0.4297	0.40	0.61	0.50		Second sp. gr. determination made on sap-wood.....	142
0.3282	0.3741		0.3487	0.53	0.44	0.49		All sap-wood.....	544
0.4018	0.4002		0.4010	0.35	0.35	0.35		All sap-wood.....	764
			0.3931			0.45	24.50		

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
379. <i>Pinus Banksiana</i> <i>Gray Pine. Scrub Pine. Prince's Pine.</i>	804	Michigan	Baldwin	W. J. Beal	Low, sandy			
	780	New Brunswick		Intercolonial railway.				
	879	do		do				
380. <i>Pinus palustris</i> <i>Long-leaved Pine. Southern Pine. Georgia Pine. Yellow Pine. Hard Pine.</i>	81	Florida	Duval county	A. H. Curtiss	Sandy loam	0.353	25	119
	85	do	do	do	Moist, sandy	0.355	46	51
	172	Mississippi	Barney & Smith Manufacturing Co	E. E. Barney				
	243	Florida	Saw-mill, Saint John's river.	A. H. Curtiss				
	302	South Carolina	Alken	H. W. Ravenel	Sandy loam			
	357	Alabama	Cottage Hill	C. Mohr	do			
	352	do	Citronelle	do	do			
	359	do	Churchula	do	do			
	360	do	do	do	do			
	361	do	do	do	do			
	384	Florida	Saw-mill, Cedar Keys.	A. H. Curtiss				
	385	do	do	do				
	390	North Carolina	Wilmington	E. Kidder				
602	Texas	Sabine county	G. W. Letterman					
1096	Alabama	Mobile	C. Mohr					
381. <i>Pinus Oubensis</i> <i>Slash Pine. Swamp Pine. Bastard Pine. Meadow Pine.</i>	84	Florida	Duval county	A. H. Curtiss	Moist, sandy	0.326	58	50
	356	Alabama	Cottage Hill	C. Mohr	do			
	493	Florida	Bay Biscayne	A. H. Curtiss	Coral			
382. <i>Picea nigra</i> <i>Black Spruce.</i>	109	Vermont	Charlotte	C. G. Pringle	Gravelly			
	231	do	do	do	Cold, peaty			
	373	do	Huntingdon	do	Gravelly			
	776	New Brunswick	Bay of Fundy	Intercolonial railway.				
	794	Province Quebec	Danville	Grand Trunk railway.				
	880	New Brunswick	Bridgeton	Ed. Sinclair				
383. <i>Picea alba</i> <i>White Spruce.</i>	513	New Hampshire	Stratford	C. G. Pringle		0.186	16	22
	620	Dakota	Terry's peak	Robert Douglas	Gravelly			
	773	New Brunswick	Bay of Fundy	Intercolonial railway.				
	784	do	Bridgeton	Ed. Sinclair				
	791	Province of Quebec	Amqui	A. Grant				
384. <i>Picea Engelmanni</i> <i>White Spruce.</i>	292	Colorado	Forest City	T. S. Brandegees	Damp	0.320	8	76
	575	do	do	C. S. Sargent	Peaty			
	822	do	do	T. S. Brandegees	do	0.318	45	71
	899	do		Department of Agriculture.				
	005	Utah		do				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.4622	0.4965		0.4794	0.28	0.33	0.30			394
	0.4588		0.4588	0.20	0.19	0.20		Sap-wood	780
0.4778	0.5005	0.4857	0.4900	0.19	0.18	0.19			870
			0.4761			0.22	29.07		
0.7551	0.7284		0.7418	0.26	0.26	0.26			81
0.7117			0.7117	0.16	0.17	0.17			85
0.6927	0.6974		0.6950	0.26	0.26	0.26			172
0.7509	0.6829		0.7199	0.28	0.21	0.25			243
0.6139	0.5191		0.5665	0.39	0.24	0.31			302
0.6602	0.6616		0.6609	0.27	0.27	0.27			357
0.8652	0.9325		0.8989	0.28	0.20	0.24		Boxed for turpentine, 1852; chipped 10 years; abandoned, 1861.	358
0.8509	0.8450		0.8479	0.15	0.16	0.16		Boxed for turpentine, 1876; chipped 4 years; specimen taken along chip.	359
0.6673	0.7914		0.7294	0.21		0.21		Boxed for turpentine, 1876; chipped 4 years; specimen taken above chip.	360
0.7590	0.7736		0.7663	0.23	0.23	0.23		Boxed for turpentine, 1878; chipped 2 years	361
0.6163	0.5714		0.5938	0.32	0.32	0.32			384
0.6549	0.5924		0.6236	0.28	0.28	0.28			385
0.4002	0.6186	0.6413	0.5734	0.29	0.34	0.32			390
0.7744	0.6745		0.7245	0.17	0.18	0.18			562
0.6415	0.6490		0.6453	0.19	0.20	0.22		Tree boxed for turpentine 18 or 20 years ago	1096
			0.6090			0.25	43.62		
0.6533	0.6506		0.6520	0.31	0.31	0.31			84
0.7881	0.7340		0.7611	0.16	0.15	0.16			356
0.8529	0.8389	0.8220	0.8379	0.30	0.31	0.31			493
			0.7504			0.26	46.70		
0.4576	0.4715		0.4646	0.23	0.17	0.20		[P. rubra]	109
0.5289	0.5266		0.5272	0.25	0.27	0.26			231
0.4285	0.4436		0.4366	0.29	0.29	0.29		[P. rubra]	373
0.4730	0.4593		0.4662	0.29	0.27	0.28			776
0.4065	0.4290	0.3907	0.4087	0.29	0.25	0.27			794
0.4830	0.4098	0.4425	0.4451	0.38	0.28	0.33			880
			0.4584			0.27	28.57		
0.4074	0.4194		0.4134	0.20	0.21	0.24			613
0.8848	0.4034		0.8041	0.42	0.38	0.40			620
0.4231	0.4375		0.4303	0.34	0.38	0.36			773
0.3809	0.4188		0.3999	0.32	0.31	0.32			784
0.3737	0.4020		0.3879	0.24	0.29	0.27			791
			0.4051			0.32	25.25		
0.3550	0.3551		0.3551	0.36	0.29	0.33			202
0.3365	0.3217		0.3291	0.35	0.35	0.35			575
0.3507	0.3528		0.3518	0.29	0.24	0.27		Tree with gray bark	822
0.3717	0.3725		0.3721	0.32	0.33	0.33			809
0.3195	0.3137		0.3166	0.43	0.26	0.34			905
			0.3440			0.32	21.49		

## FOREST TREES OF NORTH AMERICA.

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
385. <i>Picea pungens</i> ..... <i>White Spruce. Blue Spruce.</i>	269	Colorado	Alpine	T. S. Brandegee	Damp			
	270	do	do	do	do			
	901	do		Department of Agriculture.				
	906	Utah		do				
386. <i>Picea Sitkensis</i> ..... <i>Tide-land Spruce.</i>	970	Alaska	Sitka	Paul Schultze.				
	977	British Columbia	Saw-mill, Burrard inlet.	G. Engelmann and C. S. Sargent.				
	1015	Oregon	Weidler's mill, Portland.	do				
	1010	do	Saw-mill, Astoria.	do				
	1026	do	Portland Furniture Company.	do				
387. <i>Tsuga Canadensis</i> ..... <i>Hemlock.</i>	5	Massachusetts	Arnold Arboretum.	C. S. Sargent	Drift	0.382	37	57
	219	Vermont	Charlotte	C. G. Pringle	Gravelly			
	726	Pennsylvania	Williamsport	do	Damp			
	772	New Brunswick		Intercolonial railway.				
	775	do	Bay of Fundy	do				
	778	do		do				
	787	do	Bridgeton	Ed. Sinclair.				
	798	Province Quebec	Danville	Grand Trunk railway.				
	817	West Virginia	Grafton	C. G. Pringle				
	1040	Massachusetts	Danvers	J. Robinson	Moist loam	0.230	26	92
	1042	do	North Reading	do		0.200	16	82
388. <i>Tsuga Caroliniana</i> ..... <i>Hemlock.</i>	628	North Carolina	Hendersonville	A. H. Curtiss.	Dry, rocky	0.228	51	14
389. <i>Tsuga Mertensiana</i> ..... <i>Hemlock.</i>	971	Washington territory.	Wilkeson	G. Engelmann and C. S. Sargent.	Rich loam			
	995	Alaska	Sitka	Paul Schultze.				
390. <i>Tsuga Pattoniana</i> .....	980	British Columbia	Silver peak, near Fraser river.	G. Engelmann and C. S. Sargent.	Gravelly loam			
391. <i>Pseudotsuga Douglasii</i> ..... <i>Red Fir. Yellow Fir. Oregon Pine. Douglas Fir.</i>	271	Colorado	Alpine	T. S. Brandegee	Moist	0.276	40	155
	627	California	Saw-mill, Strawberry valley.	G. Engelmann and C. S. Sargent.				
	702	Oregon	Saw-mill, Marshfield	do				
	704	do	do	do				
	705	do	E. B. Dean's saw-mill, Marshfield.	do				
	706	do	do	do				
	708	do	do	do				
	709	do	do	do				
	720	Montana	Saw-mill, Missoula.	S. Watson				
	732	California	Lassen's peak.	Sierra Lumber Company.				
	881	Utah	Salt Lake	M. E. Jones	Rocky			
	978	British Columbia	Saw-mill, Burrard inlet.	C. S. Sargent.				
	974	do	do	do				
	988	do	Saw-mill, Victoria	G. Engelmann and C. S. Sargent.				
	989	Oregon	Saw-mill, Portland	do				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.3480			0.3480	0.22		0.22			269
0.3540	0.3558		0.3549	0.32	0.20	0.31			270
0.4309	0.4274		0.4292	0.40	0.51	0.50			901
0.3764	0.3617		0.3641	0.69	0.28	0.48			906
			0.3740			0.38	23.31		
0.0029	0.0485		0.0257	0.23	0.24	0.24			970
0.3658	0.3974		0.3816	0.16	0.17	0.17			977
0.4280			0.4280	0.16	0.13	0.15			1015
0.3520	0.3423	0.3446	0.3463	0.22	0.13	0.18			1019
0.3661	0.3576		0.3619	0.13	0.12	0.13			1020
			0.4237			0.17	26.72		
0.3880	0.3896		0.3888	0.24	0.25	0.25			5
0.4688	0.4624		0.4629	0.73	0.67	0.70			219
0.3817	0.3823		0.3820	0.43	0.36	0.40			720
0.3963	0.4704		0.4333	0.45	0.46	0.46		Red hemlock	772
0.4830	0.4707		0.4773	0.34	0.42	0.38		White hemlock	775
0.3418	0.3343		0.3381	0.54	0.56	0.55			778
0.4532	0.4533		0.4533	0.44	0.43	0.46			787
0.5033	0.5191		0.5112	0.46	0.46	0.46			793
0.3719	0.3500		0.3610	0.45	0.51	0.48			817
0.4213	0.4554	0.4561	0.4443	0.51	0.60	0.56			1040
0.4112	0.4080	0.4098	0.4097	0.52	0.31	0.42			1042
			0.4239			0.46	26.42		
0.4239	0.4260		0.4275	0.39	0.41	0.40	26.04		623
0.5671	0.4833		0.5252	0.41	0.45	0.43			971
0.4981	0.4975	0.5411	0.5122	0.43	0.39	0.41			995
			0.5182			0.42	32.29		
0.4462	0.4396	0.4503	0.4454	0.34	0.53	0.44	27.76		986
0.4461	0.4674		0.4568	0.16		0.10			271
0.5570	0.5653		0.5612	0.10	0.06	0.08			627
0.4083	0.4364		0.4214	0.08	0.07	0.08		Coarse-grained	702
0.6332	0.6789		0.6551	0.02	0.03	0.03		Grown near the ocean	704
0.5215	0.5256		0.5233	0.03	0.01	0.02		Coarse-grained best quality	705
0.5493	0.5937		0.5715	0.10	0.06	0.08		Fine-grained best quality	706
0.6189	0.5785		0.5987	0.02	0.03	0.03		Coast fir	708
0.4254	0.3859		0.4057	0.04	0.03	0.04		20 miles from coast, clear yellow	709
0.5269	0.5215		0.5242	0.09	0.12	0.11			720
0.4896	0.4941		0.4918	0.12	0.13	0.13			732
0.5251	0.5855		0.5553	0.18	0.18	0.18			881
0.4809	0.4679		0.4744	0.05	0.06	0.06		Red fir	973
0.5028	0.4848		0.4988	0.05	0.04	0.05		Yellow fir	974
0.4511	0.4504		0.4508	0.10	0.08	0.09			986
0.5990	0.5922		0.5956	0.10	0.11	0.11			989

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
391. <i>Pseudotsuga Douglasii</i> —continued . . . . .	1008	British Columbia.	Saw-mill, Burrard inlet.	G. Engelmann and C. S. Sargent.				
	1011	Oregon . . . . .	Oregon Railway and Navigation Co.	do				
	1016	do . . . . .	Weidler's saw-mill, Portland.	do				
	1018	do . . . . .	Saw-mill, Astoria . . . . .	do				
	1020	do . . . . .	Portland Furniture Company.	do				
	1022	do . . . . .	Portland Furniture Company.	do				
391. <i>Pseudotsuga Douglasii</i> , var. <i>macrocarpa</i> . <i>Hemlock.</i>	642	California . . . . .	Saw-mill, San Bernardino.	W. G. Wright . . . . .				
392. <i>Abies Fraseri</i> . . . . . <i>Balsam. She Balsam.</i>	523	North Carolina . . . . .	Roan mountain . . . . .	Walcott Gibbs . . . . .	Peaty loam . . . . .	0.180	46	
393. <i>Abies balsamea</i> . . . . . <i>Balsam Fir. Balm of Gilead Fir.</i>	167	Vermont . . . . .	Green mountains . . . . .	C. G. Pringle . . . . .	Cold, gravelly loam			
	377	do . . . . .	Monkton . . . . .	do	Peaty . . . . .			
394. <i>Abies subalpina</i> . . . . . <i>Balsam.</i>	449 <sup>1</sup>	Colorado . . . . .	Forest City . . . . .	T. S. Brandegee . . . . .	Moist, sandy loam.			
	449 <sup>2</sup>	do . . . . .	do . . . . .	do	do			
	820	do . . . . .	do . . . . .	do	do	0.344	17	165
395. <i>Abies grandis</i> . . . . . <i>White Fir.</i>	950							
	1009	Oregon . . . . .	Portland . . . . .	G. Engelmann and C. S. Sargent.	Rich, alluvial . . . . .	0.735	50	48
	1010							
396. <i>Abies concolor</i> . . . . . <i>White Fir. Balsam Fir.</i>	529	Colorado . . . . .	Engelmann's cañon . . . . .	Robert Douglas . . . . .	Rocky . . . . .	0.196	29	
	580	California . . . . .	Strawberry valley . . . . .	G. Engelmann and C. S. Sargent.	Alluvial . . . . .			
	689	do . . . . .	do . . . . .	do	do			
	788	do . . . . .	Lassen's peak . . . . .	Sierra Lumber Company.				
397. <i>Abies bracteata</i> . . . . .	572	do . . . . .	Santa Lucia mountains.	G. R. Vasey . . . . .				
398. <i>Abies amabilis</i> . . . . .	1004	British Columbia . . . . .	Silver peak, near Fraser river.	G. Engelmann and C. S. Sargent.	Rich, sandy loam . . . . .	0.584	50	120
399. <i>Abies nobilis</i> . . . . . <i>Red Fir.</i>	965	Oregon . . . . .	Cascade mountains . . . . .	do	Rich . . . . .			
400. <i>Abies magnifica</i> . . . . . <i>Red Fir.</i>	647	California . . . . .	Soda Springs . . . . .	do	Gravelly loam . . . . .	1.324	71	267
401. <i>Larix Americana</i> . . . . . <i>Larch. Black Larch. Tamarack. Hackmatack.</i>	226 <sup>1</sup>	Vermont . . . . .	Charlotte . . . . .	C. G. Pringle . . . . .	Cold, swampy . . . . .			
	226 <sup>2</sup>	do . . . . .	do . . . . .	do	do			
	226 <sup>3</sup>	do . . . . .	do . . . . .	do	do			
	774	New Brunswick . . . . .	Bay of Fundy . . . . .	Intercolonial railway.				
	781	do . . . . .	do . . . . .	do				
	786	do . . . . .	Bridgeton . . . . .	Ed. Sinclair . . . . .				
	795	do . . . . .	Danville . . . . .	Grand Trunk railway.				
840	Massachusetts . . . . .	Wenham . . . . .	J. Robinson . . . . .	Swampy . . . . .				

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.5266			0.5266	0.03	0.04	0.04			1008
0.4902	0.4867		0.4885	0.03	0.03	0.03		Railroad tie	1011
3.5831	0.5590		0.5715	0.11	0.07	0.09			1016
0.5060	0.5725		0.5692	0.05	0.04	0.05			1018
0.4331	0.4422		0.4377	0.07	0.11	0.09			1020
0.4562	0.4588		0.4575	0.06	0.07	0.07			1022
			0.5157			0.08	32.14		
0.4064	0.4463		0.4563	0.08	0.08	0.08	28.44		642
0.3699	0.3431		0.3565	0.47	0.60	0.54	22.22		523
0.3386	0.3342		0.3364	0.63	0.49	0.56			107
0.4248	0.4209		0.4273	0.33	0.35	0.34			377
			0.3819			0.45	23.80		
0.3446	0.3515		0.3481	0.66		0.66			449 <sup>1</sup>
0.3442	0.3641		0.3541	0.33		0.33			449 <sup>2</sup>
0.3475	0.3397	0.3342	0.3405	0.34	0.33	0.34			820
			0.3476			0.44	21.66		
0.3416	0.3371		0.3545	0.38	0.32	0.49	21.97	One tree	950
0.3643	0.3842	0.3531		0.63	0.57				
0.3390	0.3625			0.56	0.47				
0.3613	0.3717		0.3665	0.87	0.89	0.88			529
0.3059	0.2910		0.2985	1.12	1.12	1.12			580
0.3236	0.3780		0.3533	0.56	0.48	0.52			630
0.4242	0.4500		0.4371	0.70	1.04	0.87			733
			0.3633			0.85	22.67		
0.7082	0.0483		0.0783	2.09	1.09	2.04	42.27		572
0.4297	0.4159		0.4228	0.25	0.21	0.23	26.35		1004
0.4625	0.4497		0.4561	0.27	0.41	0.34	28.42		965
0.4752	0.4614	0.4738	0.4701	0.30	0.30	0.30	29.30		647
0.6973	0.7075		0.7024	0.26		0.26			226 <sup>1</sup>
0.6945	0.7779		0.7362	0.27		0.27			226 <sup>2</sup>
0.6835	0.6069		0.6452	0.32		0.32			226 <sup>3</sup>
0.5975	0.5765		0.5870	0.30	0.27	0.28			774
0.5925	0.5740		0.5833	0.47	0.49	0.48			781
0.5389	0.5570		0.5479	0.35	0.30	0.33			786
0.5882	0.5864		0.5873	0.36	0.32	0.34			795
		0.6000	0.6000	0.27	0.43	0.38			840
			0.6236			0.33	38.86		

TABLE I.—SPECIFIC GRAVITY, ASH, AND WEIGHT PER CUBIC FOOT

Species.	Office number.	State.	Locality.	Collector.	Soil.	Diameter of tree, in meters.	LAYERS OF GROWTH.	
							Sap-wood.	Heart-wood.
402. <i>Larix occidentalis</i> ..... <i>Tamarack.</i>	719	Montana.....	Missoula.....	S. Watson .....				
	984	Washington ter- ritory.	Fulda.....	William N. Sicksdorf.	Moist.....			
	1006	do .....	do .....	do .....				
<b>PALMACEÆ.</b>								
404. <i>Sabal Palmetto</i> ..... <i>Cabbage Tree. Cabbage Palmetto.</i>	242	Florida .....	Sister island .....	A. H. Curtiss .....	Shell.....			
405. <i>Washingtonia filifera</i> ..... <i>Fan-leaf Palm.</i>	1160	California .....	Agua Caliente.....	W. G. Wright.....	Dry, gravelly			
408. <i>Thrinax parviflora</i> ..... <i>Silk-top Palmetto.</i>	504	Florida .....	Long Key .....	A. H. Curtiss .....	Coral .....			
	1107	do .....	Bahia Honda Key .....	do .....	do .....			
407. <i>Thrinax argentea</i> ..... <i>Silver-top Palmetto. Brickley Thatch.</i> <i>Brittle Thatch.</i>	506	do .....	Sugar-leaf Sound .....	do .....	do .....			
	1118	do .....	No-Name Key .....	do .....	do .....			
408. <i>Oreodoxa regia</i> ..... <i>Royal Palm.</i>	565	do .....	Big Cypress .....	do .....	Rich humus			
	1119	do .....	Lost Man's river.....	do .....	do .....			
<b>LILIACEÆ.</b>								
409. <i>Yucca canaliculata</i> ..... <i>Spanish Bayonet.</i>	1063	Texas .....	Matagorda.....	C. Mohr .....	Sandy, saline			
410. <i>Yucca brevifolia</i> ..... <i>The Joshua. Joshua Tree.</i>	605	California .....	Mohave.....	G. Engelmann and C. S. Sargent.	Dry, gravelly			
	606	do .....	do .....	do .....	do .....			
411. <i>Yucca elata</i> ..... <i>Spanish Bayonet.</i>	600	Arizona.....	Tucson .....	do .....	do .....			
412. <i>Yucca baccata</i> ..... <i>Spanish Bayonet. Mexican Banana.</i>	1003	California.....	San Diego .....	G. Engelmann.....	do .....			

OF DRY SPECIMENS OF THE WOODS OF THE UNITED STATES—Continued.

SPECIFIC GRAVITY DETERMINATIONS.				ASH DETERMINATIONS.			Weight, per cubic foot, in pounds (average).	Remarks.	Office number.
First.	Second.	Third.	Average.	First.	Second.	Average.			
0.6603	0.5897	.....	0.6280	0.08	0.09	0.09	.....	710	
0.7717	0.7839	.....	0.7778	0.09	0.09	0.09	.....	984	
0.8340	0.7984	.....	0.8162	0.07	0.12	0.09	.....	1006	
			0.7407			0.09	46.16		
0.5002	0.4020	0.4191	0.4404	7.51	7.80	7.66	27.44	242	
0.5597	0.4942	}	0.5173	1.80	1.98	1.89	32.24	1150	
0.4700	0.5453								
0.7014	0.7258	.....	0.7136	2.65	2.79	2.72	.....	504	
0.4539	0.4957	0.5039	0.4845	5.73	4.81	5.27	.....	1107	
			0.5991			3.99	37.84		
0.7357	0.7468	.....	0.7412	1.71	2.19	1.95	.....	506	
0.6775	0.6907	0.7118	0.6983	3.90	4.25	4.07	.....	1116	
			0.7172			3.01	44.70		
0.2870	0.1887	.....	0.2128	2.06	2.52	2.74	Pith ..	} One tree	
0.8178	0.8807	.....	0.8402	1.31	1.14	1.23	Rind ..		
0.7451	0.7513	.....	0.7482	2.79	2.53	2.66	Rind ..		
			0.6034			2.21	37.60	1119	
0.7162	0.5875	0.6994	0.6677	7.03	5.52	6.27	41.61	1083	
0.3473	0.3472	.....	0.3472	5.53	4.75	5.14	.....	695	
0.4002	0.4002	.....	0.4002	2.66	3.08	2.87	.....	696	
			0.3737			4.00	28.29		
0.2327	0.6511	0.4572	0.4470	8.50	10.06	9.28	27.86	600	
0.1990	0.3458	.....	0.2724	8.94	.....	8.94	16.97	1003	

TABLE II.—ACTUAL FUEL VALUE OF SOME OF THE

Office number.	Catalogue number.	Botanical name.	Common name.	Region.	FUEL VALUE.	
					Per cubic decimeter.	Per kilogram.
165	8	<i>Liriodendron Tulipifera</i>	Tulip Tree. Yellow Poplar. White Wood	Atlantic	1425.57	3744.61
903	20	<i>Bursera gummifera</i>	Gum Elemi. Gumbo Limbo. West Indian Birch	Semi-tropical Florida	997.32	2913.58
452	31	<i>Swietenia Mahogoni</i>	Mahogany. Madeira	do	2760.31	3802.95
274	64	<i>Acer saccharinum, var. nigrum</i>	Black Sugar Maple	Atlantic	3091.37	4345.48
845	77	<i>Robinia Pseudacacia</i>	Locust. Black Locust. Yellow Locust	do	2822.99	3890.02
927	93	<i>Prosopis juliflora</i>	Mesquit. Algaroba. Honey Locust. Honey Pod.	Mexican boundary	3291.21	4352.30
883	115	<i>Cercocarpus ledifolius</i>	Mountain Mahogany	Interior Pacific	4234.06	4052.90
1182	139	<i>Liquidambar styraciflua</i>	Sweet Gum. Star-leaved Gum. Liquidambar. Red Gum. Bilsted.	Atlantic	2255.24	4016.46
128	155	<i>Nyssa uniflora</i>	Large Tupelo. Cotton Gum. Tupelo Gum	Southern Atlantic	2332.41	4131.39
1084	184	<i>Diospyros Virginiana</i>	Persimmon	Atlantic	2970.45	3781.61
227	192	<i>Fraxinus Americana</i>	White Ash	do	2652.34	4217.42
180	207	<i>Catalpa speciosa</i>	Western Catalpa	do	1582.42	3936.38
533	224	<i>Ulmus Americana</i>	White Elm. American Elm. Water Elm	do	3247.02	4191.37
126	235	<i>Platanus occidentalis</i>	Sycamore. Button Wood. Button-ball Tree. Water Beech.	do	2406.89	4071.33
209	239	<i>Juglans nigra</i>	Black Walnut	do	1984.56	3857.26
322	241	<i>Carya oliviformis</i>	Pecan. Illinois Nut	do	2703.72	3954.75
29	242	<i>Carya alba</i>	Shell-bark Hickory. Shag-bark Hickory	do	3851.17	4078.76
539					3319.79	3811.43
72	244	<i>Carya tomentosa</i>	Mocker Nut. Black Hickory. Bull Nut. Big-bud Hickory. White-heart Hickory. King Nut.	do	3380.57	3904.11
1051	245	<i>Carya porcina</i>	Pig Nut. Brown Hickory. Black Hickory. Switch-bud Hickory.	do	3392.12	3922.89
898	246	<i>Carya amara</i>	Bitter Nut. Swamp Hickory	do	2863.42	3903.25
237	247	<i>Carya myristiciformis</i>	Nutmeg Hickory	Southern Atlantic	3108.27	3877.58
362	248	<i>Carya aquatica</i>	Water Hickory. Swamp Hickory. Bitter Pecan.	do	3140.33	4073.59
1050	251	<i>Quercus alba</i>	White Oak	Atlantic	3197.41	4187.33
988	253	<i>Quercus Garryana</i>	do	Northern Pacific	2594.31	3667.39
424	257	<i>Quercus lyrata</i>	Over-cup Oak. Swamp Post Oak. Water White Oak.	Southern Atlantic	3208.92	4105.05
31	260	<i>Quercus Prinus</i>	Chestnut Oak. Rock Chestnut Oak	do	2343.69	3997.32
92	272	<i>Quercus rubra</i>	Red Oak. Black Oak	Atlantic	3062.08	4075.16
247	274	<i>Quercus tinctoria</i>	Black Oak. Yellow-bark Oak. Quercitron Oak. Yellow Oak.	do	2595.04	3774.60
339	276	<i>Quercus nigra</i>	Black Jack. Jack Oak	do	2692.51	3713.81
548	277	<i>Quercus falcata</i>	Spanish Oak. Red Oak	Southern Atlantic	3193.28	4055.48
511	280	<i>Quercus aquatica</i>	Water Oak. Duck Oak. Possum Oak. Punk Oak	do	2655.32	3718.07
368	290	<i>Castanea vulgaris, var. Americana</i>	Chestnut	Atlantic	1898.25	4042.96
55	291	<i>Fagus ferruginea</i>	Beech	do	2795.34	3895.04
848	294	<i>Betula alba, var. populifolia</i>	White Birch. Old-field Birch. Gray Birch	Northern Atlantic	2509.00	4073.05
225	295	<i>Betula papyrifera</i>	Canoe Birch. White Birch. Paper Birch	do	2532.66	4101.41
272	318	<i>Populus tremuloides</i>	Aspen. Quaking Asp	Atlantic and Pacific	1624.64	4292.31
754	324	<i>Populus monilifera</i>	Cottonwood. Necklace Poplar. Carolina Poplar. Big Cottonwood.	Atlantic	1906.42	4242.15
874	327	<i>Thuja occidentalis</i>	White Cedar. Arbor-vitae	Northern Atlantic	1411.57	3917.77
701	331	<i>Chamaecyparis Lawsoniana</i>	Port Orford Cedar. Oregon Cedar. White Cedar. Lawson's Cypress. Ginger Pine.	Northern Pacific	2327.52	5263.50
527	338	<i>Juniperus occidentalis, var. monosperma</i>	Juniper	Pacific	3143.57	4587.81
923	340	<i>Taxodium distichum</i>	Bald Cypress. Black Cypress. Red Cypress. White Cypress. Deciduous Cypress.	Southern Atlantic	1935.71	4739.73
711	342	<i>Sequoia sempervirens</i>	Redwood	California coast	1935.50	4191.47
1044	347	<i>Pinus Strobus</i>	White Pine. Weymouth Pine	Northern Atlantic	1439.03	4272.69
638	349	<i>Pinus Lambertiana</i>	Sugar Pine	Pacific	1735.40	4419.31
900	356	<i>Pinus monophylla</i>	Piñon. Nut Pine	Interior Pacific	2248.13	4107.68
194	358	<i>Pinus resinosa</i>	Red Pine. Norway Pine	Northern Atlantic	2051.75	4226.05
632	361	<i>Pinus ponderosa</i>	Yellow Pine. Bull Pine	Pacific	2441.24	4600.04
625	365	<i>Pinus Murrayana</i>	Tamarack. Black Pine. Lodge-pole Pine. Spruce Pine.	do	1791.32	4019.12
571	366	<i>Pinus Sabiniana</i>	Digger Pine. Bull pine	California	1804.29	3932.97
389	370	<i>Pinus Taeda</i>	Loblolly Pine. Old-field Pine. Rosemary Pine	Southern Atlantic	2031.75	4087.20
1046	371	<i>Pinus rigida</i>	Pitch Pine	Atlantic coast	3472.26	5491.47
83	372	<i>Pinus serotina</i>	Pond Pine	Southern Atlantic	3930.96	5012.54
621	373	<i>Pinus inops</i>	Jersey Pine. Scrub Pine	Atlantic	2003.20	4126.15
321	375	<i>Pinus pungens</i>	Table-mountain Pine. Hickory Pine	Alleghany	2054.73	3995.30
557	377	<i>Pinus mitis</i>	Yellow Pine. Short-leaved Pine. Spruce Pine. Bull Pine.	Atlantic	3091.32	5062.75

MORE IMPORTANT WOODS OF THE UNITED STATES.

RELATIVE FUEL VALUE.		PERCENTAGE IN DRY WOOD.						Specific gravity.	Weight of cubic foot, in pounds.	Office number.
By volume.	By weight.	Ash.	Hydrogen.	Carbon.	Oxygen.	Hydrogen combined with oxygen.	Excess of hydrogen.			
67	66	0.27	0.43	47.20	46.01	5.75	0.68	0.3807	23.72	165
69	70	2.09	0.02	40.80	51.09	6.39	0.36	0.3423	21.33	903
92	62	1.09	0.60	46.76	45.46	5.68	1.01	0.7282	45.38	452
23	19	0.56	0.61	51.55	41.28	5.16	1.45	0.7114	44.32	274
20	58	0.23	0.17	49.19	44.41	5.55	0.62	0.7257	45.22	845
14	18	2.05	0.61	51.08	40.26	5.03	1.58	0.7562	47.12	927
3	42	1.20	5.45	52.14	41.21	5.15	0.30	1.0447	65.10	883
45	46	0.48	5.85	50.99	42.68	5.33	0.52	0.5615	34.99	1182
43	30	0.74	0.97	48.78	43.51	5.44	1.53	0.5945	35.17	128
25	63	0.77	0.44	47.37	45.42	5.67	0.77	0.7855	48.95	1084
36	24	0.30	0.98	49.73	43.04	5.38	1.55	0.6289	39.19	227
65	52	0.47	0.92	47.44	45.17	5.65	1.27	0.4020	25.05	180
10	26	0.74	0.57	50.35	42.34	5.29	1.28	0.7746	48.27	533
42	40	0.57	5.33	51.45	42.15	5.27	0.50	0.5911	36.83	126
53	60	0.56	0.00	49.28	44.16	5.52	0.48	0.5145	32.06	209
33	50	0.95	0.15	49.51	43.39	5.42	0.73	0.7001	43.63	322
7	86	0.73	0.49	49.67	43.12	5.39	1.10	0.9442	58.84	29
13	61	0.83	0.13	48.45	44.59	5.57	0.50	0.8710	54.28	539
11	55	1.04	5.93	49.09	43.34	5.42	0.51	0.8059	53.95	72
10	53	0.74	0.23	48.98	44.00	5.50	0.78	0.8647	53.88	1051
27	56	1.03	5.91	49.71	43.29	5.41	0.50	0.7336	45.71	838
21	59	1.06	0.37	48.26	44.31	5.54	0.33	0.8016	49.95	237
20	38	1.19	0.00	49.16	43.05	5.33	1.22	0.7709	48.04	362
17	28	0.24	0.59	50.44	42.73	5.34	1.25	0.7635	46.58	1050
38	69	0.33	5.73	48.50	45.38	5.67	0.06	0.7074	44.08	988
15	33	0.58	0.75	49.22	43.45	5.49	1.32	0.7962	49.61	424
28	47	0.84	0.33	49.59	43.74	5.47	0.86	0.7114	44.32	31
24	37	0.15	0.62	49.49	43.74	5.47	1.15	0.7514	46.72	92
37	64	0.15	0.69	48.78	44.98	5.62	0.37	0.6375	43.34	247
34	68	1.37	5.73	48.58	44.32	5.54	0.10	0.7250	45.18	339
18	41	0.29	0.14	50.53	42.99	5.37	0.77	0.7874	49.07	543
35	67	0.38	5.75	48.73	44.69	5.58	0.17	0.7143	44.51	511
56	43	0.13	5.70	51.74	42.43	5.30	0.40	0.4021	28.80	863
31	57	0.54	0.11	49.27	44.08	5.51	0.00	0.7175	44.71	55
40	39	0.20	0.49	49.77	43.45	5.43	1.06	0.6100	38.05	843
90	34	0.23	7.12	48.28	44.37	5.54	1.53	0.6207	39.24	225
63	20	0.74	0.58	51.13	41.55	5.19	1.39	0.3785	23.59	272
55	22	0.65	0.26	51.64	41.45	5.18	1.08	0.4494	28.00	754
68	54	0.37	0.37	48.30	44.46	5.56	0.31	0.3603	22.45	874
44	3	0.10	0.28	60.07	33.65	4.21	2.07	0.4422	27.56	701
10	11	0.38	0.03	54.97	38.12	4.76	1.27	0.6352	42.70	527
54	8	0.40	0.54	54.98	38.08	4.76	1.78	0.4084	24.45	923
52	27	0.13	0.01	52.10	41.70	5.22	0.79	0.4787	29.52	711
66	21	0.12	0.08	52.55	41.25	5.15	0.93	0.3485	21.72	1044
59	13	0.19	0.40	52.35	40.56	5.07	1.33	0.4040	25.18	638
46	32	0.33	0.39	50.48	43.30	5.41	0.98	0.5473	34.11	900
49	23	0.20	0.07	52.18	41.55	5.10	0.38	0.4355	30.26	194
41	9	0.31	7.02	52.00	40.07	5.01	2.01	0.5307	33.07	633
58	45	0.37	0.22	50.05	43.36	5.42	0.30	0.4457	27.78	625
57	40	0.42	0.04	50.22	43.32	5.41	0.63	0.4530	28.28	571
50	35	0.25	0.23	50.60	42.92	5.36	0.37	0.4971	30.98	389
9	1	1.12	7.19	59.00	32.63	4.08	3.11	0.6323	39.40	1046
6	6	0.17	0.30	56.55	36.48	4.56	2.24	0.7042	49.49	83
51	31	0.26	0.30	50.74	42.70	5.34	0.96	0.4867	30.33	321
48	48	0.30	5.78	51.07	42.35	5.35	0.43	0.5143	32.05	321
22	5	0.20	0.91	56.64	36.25	4.53	2.33	0.6107	38.00	557

TABLE II.—ACTUAL FUEL VALUE OF SOME OF THE

Office number.	Catalogue number.	Botanical name.	Common name.	Region.	FUEL VALUE.	
					Per cubic decimeter.	Per kilogram.
879	379	<i>Pinus Banksiana</i> .....	Gray Pine. Scrub Pine. Prince's Pine.....	Northern Atlantic.....	2152.66	4393.18
a 359	380	<i>Pinus palustris</i> .....	{ Long-leaved Pine. Southern Pine. Georgia } { Pine. Yellow Pine. Hard Pine. }	South Atlantic coast.....	4346.88	5126.04
81					4064.77	5480.35
385					2810.20	4506.42
b 358					4129.95	4594.07
358					4319.67	4806.05
356	381	<i>Pinus Cubensis</i> .....	Slash Pine. Swamp Pine. Bastard Pine. Meadow Pine.	do.....	3303.40	4418.55
794	382	<i>Picea nigra</i> .....	Black Spruce.....	Northern Atlantic.....	1614.11	3049.37
1042	387	<i>Tsuga Canadensis</i> .....	Hemlock.....	do.....	1724.25	4208.53
709	391	<i>Pseudotsuga Douglasii</i> .....	Red Fir. Yellow Fir. Oregon Pine. Douglas Fir.	Pacific.....	1706.32	4354.64
226	401	<i>Larix Americana</i> .....	Larch. Black Larch. Tamarack. Hackmatack.	Northern Atlantic.....	2937.46	4182.04
242	404	<i>Sabal Palmetto</i> .....	Cabbage Tree. Cabbage Palmetto.....	South Atlantic coast.....	1653.35	3754.21
c 605	408	<i>Oreodoxa regia</i> .....	Royal Palm.....	Semi-tropical Florida.....	859.07	4037.01
d 405					3708.48	4367.03

a Boxed for turpentine 1876; chipped 4 years; specimen taken along chip.

b Boxed for turpentine 1852; chipped 10 years; abandoned 1861.

c Fifth.

d Rind.

## MORE IMPORTANT WOODS OF THE UNITED STATES—Continued.

RELATIVE FUEL VALUE.		PERCENTAGE IN DRY WOOD.						Specific gravity.	Weight of cubic foot, in pounds.	Office number.
By volume.	By weight.	Ash.	Hydrogen.	Carbon.	Oxygen.	Hydrogen combined with oxygen.	Excess of hydrogen.			
47	15	0.19	6.29	52.93	46.59	5.07	1.22	0.4000	30.54	879
1	4	0.15	7.26	50.19	36.30	4.54	2.72	0.3479	52.84	359
5	2	0.26	7.41	58.61	33.72	4.21	3.20	0.7417	46.22	81
30	12	0.28	6.70	52.70	40.32	5.04	1.66	0.6236	38.86	385
4	10	0.28	6.85	52.99	39.88	4.99	1.86	0.8988	55.96	358
2	7	0.24	6.89	54.78	38.15	4.77	2.06	0.8988	55.96	358
12	14	0.16	6.22	53.33	40.29	5.03	1.10	0.7612	47.44	356
64	51	0.30	6.58	48.45	44.07	5.58	1.00	0.4087	25.47	794
61	25	0.48	5.91	52.38	41.23	5.15	0.76	0.4097	25.53	1042
60	17	0.03	6.42	52.32	41.23	5.15	1.27	0.4056	25.28	709
26	29	0.27	6.03	51.91	41.79	5.22	0.81	0.7024	43.77	226
62	65	7.66	7.00	43.85	41.93	5.24	1.82	0.4404	27.45	242
70	44	2.74	6.82	47.73	42.71	5.34	1.48	0.2123	13.26	565
8	16	1.24	6.98	50.46	41.32	5.16	1.82	0.8492	52.92	565

23 FOR