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PARIS--1867

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STATE OF ILLINOIS

AND THE

UNIVERSAL EXPOSITION OF 1867,

AT

PARIS, FRANCE.

REPORT OF JOHN P. REYNOLDS,

DELEGATE FROM THE ILLINOIS STATE AGRICULTURAL SOCIETY, AND COM-
MISSIONER FOR THE STATE.

SPRINGFIELD:
STATE JOURNAL PRINTING OFFICE.
1868.

ILLINOIS STATE AGRICULTURAL SOCIETY.

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JOHN P. REYNOLDS, SECRETARY.....	Springfield.		

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PALACE AND PARK—EXPLANATION OF THE MAP.

NATIONS EXHIBITING.

A. France.	I. Portugal.	R. Egypt.
B. The Low Countries.	J. Greece.	S. China, Japan and Siam.
C. Belgium.	K. Denmark.	T. Persia.
D. Prussia and the North German States.	L. Sweden and Norway.	W. Tunis and Morocco.
E. Hesse, Baden, Wurtemberg and Bavaria.	M. Russia.	V. United States, N. A.
F. Austria.	N. Italy.	X. Brazil, American Republics and Hawaii.
G. Switzerland.	O. Pontifical States.	Y. Great Britain and Ireland and Colonies.
H. Spain.	P. Roumanian (Danubian) Principalities.	
	Q. Turkey.	

PALACE.

Starting from the Central Pavilion in the Jardin Central (Central Garden) are encountered successively:

- Gallery I. Oeuvres d' Art—Works of Art.
 Gallery II. Matériel des Arts Libéraux—Material of the Liberal Arts.
 Gallery III. Mobilier—Furniture.
 Gallery IV. Vêtement—Clothing.
 Gallery V. Matières Premières—Raw Materials, Minerals, etc.
 Gallery VI. Travaux des Arts usuels—Operations of the common arts.
 Gallery VII. Aliments et Boissons—Foods and Drinks.

The Galleries refer to and correspond in number with the Groups; the Roman numerals (in the Palace) to the regular classes. See classification pp. 25 to —

PARK.

On the right next to the Seine.

<i>France.</i>	29. Smoke consumers.
1. Equestrian Statue of Charlemagne.	30. Manufacture of Stearine.
2. Châlet of the Imperial Commission.	31. Society for the protection of animals.
3. Portable Engine.	32. Wind-mills.
4. Steam Generators.	33. Workshop of Photosculpture.
5. Model of Marley's Machine.	34. Imperial Pavilion.
6. Apparatus for heating.	35. Exhibition of glass windows.
7. Photometrical apparatus.	36. Model of an Infant Asylum.
8. Machines for paper.	37. Tools for the fabrication of furniture.
9. Civil Engineering and Public Works.	38. Cabinet of electro-metallurgy.
10. Railway Material.	39. House for female laborers.
11. Bakery.	40. Steam generators.
12. Machine tools.	41. House of cheap construction.
13. General Mechanics.	42. Workmen's Lodging house.
14. Products of Mines and Metallurgy.	43. Exhibition of timber in logs.
15. Processes of heating and lighting.	44. Water-works.
16. Exposition of the Creusot. (M. Schneider & Co.)	45. Chime of bells.
17. Steam Bakery, civil and military.	46. Photics.
18. Exhibition of the Minister of War.	47. Model of cottage.
19. International Benevolent Society.	48. Dwelling for Paris workmen.
20. Workshops of Photography	49. Typographical presses.
21. Porcelains and ceramic products.	50. Steam generators.
22. Pumps.	51. Exhibition of Millstones.
23. Light house.	52. Refrigerators.
24. Church and exhibition of religious art.	53. Silks and cassimeres.
25. Béton aggloméré—Artificial stone.	54. Chocolate manufacture.
26. Gasometer.	55. Machine for working leather.
27. Cabinets of Metallurgy.	56. Machine to scour wool.
28. Monumental fountains.	57. Glass works.
	58. Laundry.
	59. Portable engine and telodynamic cable

60. Enamelled pottery.	63. Roof of Château of Pierrefonds.
61. Plating by galvanism. (Galvano plastic.)	64. Dome of hammered copper.
62. Electric light house.	65. Calvary.

MARITIME EXPOSITION,

On the banks of the Seine.

66. Human Aquarium.	<i>Danubian Principalities.</i>
67. Pleasure boats.	96. Exhibition pavilion.
68. Harbor light.	<i>Isthmus of Suez.</i>
69. Signal mast.	97. Exhibition of the canal works.
70. Marine machines.	<i>Turkey.</i>
71. Marine machines, Great Britain.	98. Mosques.
72. Pumps.	99. Baths.
73. Exhibition of ships' boats.	100. Fountains.
74. Restaurants.	101. House of Libania.
<i>Great Britain and Ireland.</i>	<i>Egypt.</i>
75. Apparatus for heating and lighting.	102. Temple of Edfou.
76. Light house.	103. Okel; Egyptian Café.
77. Munitions of war—Private exhibitors.	104. Salamlick, Palace of the Vice-Roy.
78. Minister of war.	105. Stables for dromedaries.
79. Hospital barracks.	<i>Siam.</i>
80. Steam generators.	106. Exhibition pavilion.
81. Perfume manufactory	<i>China.</i>
82. Annex for Agricultural Machinery.	107. Sale of Tea and Theatre.
<i>United States.</i>	<i>Japan.</i>
73. American Cottage.	108. Pavilion.
84. Common-school house, furthest from the Palace and the "Red, White and Blue" nearest.	<i>Tunis.</i>
85. Not used.	109. Pavilion of the Bey of Tunis.
86. Louisiana cottage.	<i>Italy.</i>
87. Boston bakery.	110. Portable engine.
88. Annex for sewing machines, locomotives, etc., etc.	111. Concert hall.
<i>Evangelical Missions.</i>	112. Agricultural products.
89. Pavilion of the Bible Society.	113. Bureau; Hand-work.
90. Exhibition Hall.	114. Catacombs of Rome.
91. Evangelical Hall.	115. Steam generators.
92. Bibles and Hebrew antiquities.	<i>Divers structures.</i>
93. Sale of popular publications.	116. Conference hall.
<i>Mexico.</i>	117. Concert hall.
94. Temple of Xochicalco.	118. Police station.
<i>Morocco.</i>	119. Vestuary.
95. Pavilion.	120. Booth for sale of tobacco.
	121. Wheeled chairs.

PARK,

Left side nearest to l'Ecole Militaire.

<i>France.</i>	134. Cooperage.
122. Statue of Don Pedro I.	135. Specimens of the Roquefort cheese cellars.
123. Exhibition of water filters.	136. Aviary and garden furniture.
124. Steam generators.	137. Colt-shed, poultry-house, and other farm structures. (Marquis d'Havrincourt.)
125. Annex for carriage work.	138. Agricultural Society of the Department of the North.
126. Exhibition of window blinds.	139. Shed for local cultures.
127. Farm house. (Dep't Seine et Marne.)	140. Bureau and store-house for contractors.
128. Poultry yard.	141. Agricultural machinery, Algeria.
129. Mushroom beds.	
130. Grand restaurant.	
131. Articles for Encampment.	
132. Wine-tasters' booth.	
133. Bathing—apparatus for.	

142. Material for rural operations.
143. Agricultural machinery.
144. Dairies.
Russia.
145. Bureau.
146. Russian house, (Isbah.)
147. Pavilion, (Yourta.)
148. Carriage and saddler's work.
149. Stables.
Switzerland.
150. Annex for bureau and fine arts.
151. Annex for agricultural machines.
Portugal.
152. Exhibition pavilion.
Spain.
153. Annex.
154. Booth for sale of drinks.
Austria.
155. Annex for agricultural machinery.
156. Timber from the government forests.
157. Exhibition of pottery.
158. Large brewery. (*Vienna Lager.*)
159. House of Lower Austria.
160. House of Upper Austria.
161. Bakery.
162. Hungarian house.
163. Tyrolean house.
Norway.
164. Cottage.
165. Dwelling house.
Denmark.
166. House.
Sweden.
167. House of Gustave Wasa and exhibition.
168. Steam generators.
Wurtemberg.
169. Annex for machinery.
Hesse.
170. Exhibition of masonry in cement.
Prussia and the North German States.
171. School-house, (Saxony.)
172. Agricultural machines.
173. Garden pavilion.
174. Bureau.
175. School house.
176. Equestrian statue of the King of Prussia.
Bavaria.
177. Annex for fine Arts.
Belgium.
178. Annex for machinery.
179. Annex for fine arts.
180. Laborers' houses.
181. Farm house.
182. Annex for machines.
183. Steam generators.
184. Equestrian statue of Charlemagne.
185. Equestrian statue of King Leopold I.
The Low Countries.
186. Shop for cutting diamonds.
187. Small farm.
188. Tent of the King. Artillery.
189. Annex for fine arts.
190. Paintings on Porcelains.
191. Steam generators.
Divers Constructions.
192. Administration and Juries of the Exposition.
193. Post and Telegraph office.
194. Concert hall.
195. Custom house.
196. Police and water stations.
197. Vestiaries.
198. Booths for sale of tobacco.
199. Chairs on wheels.
Garden.
200. Pavilion of her Majesty the Empress.
201. Monumental green-house and tent.
202. Maritime aquarium.
203. Aquarium of fresh water.
204. Green-houses.
205. Kiosques.
206. Botanical diorama.
207. Fruits and vegetables on exhibition.
208. Exhibition of tree culture.
209. Humming-bird palace.
210. Orchestra.
211. Restaurant.

THE METRIC SYSTEM.

Commercial relations among the several nations of the earth are daily becoming more intimate and assuming greater importance. Moneys, weights and measures form the machinery of this vast intercourse. The necessity for the adoption of uniform common standards seems to be admitted by all eminent publicists of all countries, and the tendency of liberal opinion is to conform to those established by France and now in actual use by larger commercial populations than any other. In 1864 the Parliament of Great Britain passed an act permitting the use of the Metric System as to weights and measures in Great Britain and Ireland. By treaty

in 1865, France, Belgium, Italy and Switzerland agreed upon the French Metric System as the basis of all subsequent coinage of money. In 1866 the Congress of the United States passed an act permitting the use of the Metric System as to weights and measures, according to values in the following table, so that all contracts, in which quantities are expressed by terms employed in that system, are valid for the corresponding quantities expressed by the terms in common use :

MEASURES OF LENGTH.

METRIC DENOMINATIONS AND VALUES.		EQUIVALENTS IN DENOMINATIONS IN USE.
Myriameter.....	10,000 metres.	6.2137 miles.
Kilometer.....	1,000 metres.	0.62137 miles, or 3,280 feet and 10 inches.
Hectometer.....	100 metres.	328 feet and 1 inch.
Decometer.....	10 metres.	39.37 inches.
Meter.....	1 metre.	39.37 inches.
Decimeter.....	0.1 of a metre.	3.937 inches.
Centimeter.....	0.01 of a metre.	0.3937 inches.
Millimeter.....	0.001 of a metre.	0.0394 inches.

MEASURES OF SURFACE.

METRIC DENOMINATIONS IN VALUE.		EQUIVALENTS IN DENOMINATIONS IN USE.
Hectare.....	10,000 square metres.	2.471 acres.
Are.....	100 square metres.	119.6 square yards.
Centare.....	1 square metre.	1550 square inches.

MEASURES OF CAPACITY.

METRIC DENOMINATIONS AND VALUES.			EQUIVALENTS IN DENOMINATIONS IN USE.	
Names.	No. of Liters.	Cubic Measure.	Dry Measure.	Liquid or Wine Measure
Kiloliter, or stera.....	1,000	1 cubic meter.....	1.308 cubic yards.....	264.19 gallons.
Hectoliter.....	100	1.10 of a cubic meter.	2 bush. and 3.35 pecks..	26.417 gallons.
Dekaliter.....	10	10 cubic decimeters...	9.08 quarts.....	2.6417 gallons.
Liter.....	1	1 cubic decimeter....	0.908 quarts.....	1.0567 quarts.
Deciliter.....	0.1	1.10 of a cubic decimeter	6.1022 cubic inches....	0.345 gills.
Centiliter.....	0.01	10 cubic centimeters..	0.6102 cubic inches.....	0.338 fluid ounces.
Milliliter.....	0.001	1 cubic centimeter...	0.061 cubic inches.....	0.27 fluid drams.

WEIGHTS.

METRIC DENOMINATION AND VALUES.			EQUIVALENTS IN DENOMINATIONS IN USE.
Names.	Number of Grams.	Weight of what quantity of water at maximum density.	Avoirdupois Weight.
Millier or Tonneau.....	1,000,000	1 cubic meter.....	2204.6 pounds.
Quintal.....	100,000	1 hectoliter.....	220.46 pounds.
Myriagram.....	10,000	10 liters.....	22.046 pounds.
Kilogram or Kilo.....	1,000	1 liter.....	2.2046 pounds.
Hectogram.....	100	1 deciliter.....	3.5274 grains.
Dekagram.....	10	10 cubic centimeters.....	0.3527 ounces.
Gram.....	1	1 cubic centimeter.....	15.432 grains.
Decigram.....	0.1	1-10 of a cubic centimeter.....	1.5432 grains.
Centigram.....	0.01	10 cubic millimeters.....	6.1543 grains.
Milligram.....	0.001	1 cubic millimeter.....	0.0154 grains.

40
40
340
16

2 24 - 64 quart
 3 pails 24 " 35-
 1/3 pail 97 2 VII 8
 280

The French METER is the *unit of length*, and is the ten-millionth part of a quarter of a terrestrial meridian, as determined by the highest authority.

The ARE is the *unit of land measure*, and equal to 100 square meters.

The LITER is the *unit of liquid measure*, and is equal to a cubic decimeter of distilled water at the temperature of 4 degrees centigrade, (39 degrees 2 minutes Fahrenheit).

The GRAMME is the *unit of weight*, and is equal to the weight of a cubic centimeter of distilled water.

The higher denominations are expressed in each case by the addition of the Greek prefixes, thus:

DECA-meter = 10 meters.

HECTO-liter = 100 liters.

KILO-gramme = 1,000 grammes.

MYRIA-meter = 10,000 meters.

The sub-multiples are expressed by the Latin prefixes, thus:

DECI-meter = 0.1 of a meter.

CENTI-meter = 0.01 of a meter.

MILLI-meter = 0.001 of a meter.

25
 24
 64

 908
 90

In Land Measure, however, an exception occurs: The *Are* equals 100 square meters; the *Hectare*, its multiple equals 100 *ares*, or 10,000 square meters; the *Centiare*, sub-multiple of the *Are*, equals one square meter; also, in the measurement of cord-wood, a *stere* equals a cubic meter; its multiple *decastere* equals *ten steres*; and its sub-multiple *decistere* equals *one-tenth of a stere*.

The *square meter* applies only to solid measure, and the *cubic meter* only to superficial measure. *transpose*

10/32/2500(80
 250

32
 21/90

MONEY.—By the French coinage the unit of money is a *franc*, which equals the weight of five grammes, composed of 835 parts silver and 135 parts alloy, and equals, also, 18 cents 6 mills. The sub-multiple is *centime*, equal to the 0.01 of a franc. The following table gives the United States coinage and the French equivalents:

United States.	French.
Nickel.	Fr. C.
Half Cent.....	0.02
Cent.....	0.05
Three Cents.....	0.15
Silver.	
Half Dime—5 cents.....	0.25
Dime—10 cents.....	0.53
Quarter Dollar—25 cents.....	1.35
Half Dollar—50 cents.....	2.65
Dollar—100 cents.....	5.30
Gold.	
Dollar—100 cents.....	5 15
Quarter Eagle—2½ dollars.....	12.90
Half Eagle—5 dollars.....	25.80
Eagle—10 dollars.....	51.65
Double Eagle—20 dollars.....	103.30
Fifty Dollars.....	258.90

25/66

530

25/66

66/250

20
 25
 8/520
 265
 530

8/330/66
 48
 30

VIII

The result of the International Monetary Conference, held during the Exposition, at which the United States was represented by Mr. S. B. Ruggles, of New York, are briefly stated in the report of Mr. R. as follows:

1. A single standard, exclusively of gold.
2. Coins of equal weight and diameter.
3. Of equal quality, (or *titre*,) nine-tenths fine.
4. The weight of the present five-franc gold piece, 1612.90 milligrams, to be the unit, with its multiples. [The weight of the present gold dollar of the United States is 1671.50 milligrams. The value of the excess over the five-franc gold piece (58.60 milligrams) slightly exceeds $3\frac{1}{2}$ cents.] To encourage the reduction of the United States half-eagle and of the British sovereign to the value and weight of 25 francs, the Conference unanimously recommended the issue of a new coin of that weight and value by France and the other gold-coining nations. The reduction in value of the half-eagle would slightly exceed $17\frac{1}{2}$ cents; in the sovereign 4 cents.
5. The coins of each nation to continue to bear the names and emblems preferred by each, but to be legal tenders, public and private, in all.

THERMOMETRIC SCALES.

The constant use abroad of the Centigrade and Réamur thermometric scales, while the Fahrenheit is the only one in common use here, I found a frequent source of embarrassment and therefore insert the following table of the three scales:

C.	R.	F.	C.	R.	F.	C.	R.	F.	C.	R.	F.
100	80.0	212.0	69	55.2	156.2	38	30.4	100.4	7	5.6	44.6
99	79.2	210.2	68	54.4	154.4	37	29.6	98.6	6	4.8	42.8
98	78.4	208.4	67	53.6	152.6	36	28.8	96.8	5	4.0	41.0
97	77.6	206.6	66	52.8	150.8	35	28.0	95.0	4	3.2	39.2
96	76.8	204.8	65	52.0	149.0	34	27.2	93.2	3	2.4	37.4
95	76.0	203.0	64	51.2	147.2	33	26.4	91.4	2	1.6	35.6
94	75.2	201.2	63	50.4	145.4	32	25.6	89.6	1	0.8	33.8
93	74.4	199.4	62	49.6	143.6	31	24.8	87.8	0	0.0	32.0
92	73.6	197.6	61	48.8	141.8	30	24.0	86.0	—	1—	0.8 30.2
91	72.8	195.8	60	48.0	140.0	29	23.2	84.2	—	2—	1.6 28.4
90	72.0	194.0	59	47.2	138.2	28	22.4	82.4	—	3—	2.4 26.6
89	71.2	192.2	58	46.4	136.4	27	21.6	80.6	—	4—	3.2 24.8
88	70.4	190.4	57	45.6	134.6	26	20.8	78.8	—	5—	4.0 23.0
87	69.6	188.6	56	44.8	132.8	25	20.0	77.0	—	6—	4.8 21.2
86	68.8	186.8	55	44.0	131.0	24	19.2	75.2	—	7—	5.6 19.4
85	68.0	185.0	54	43.2	129.2	23	18.4	73.4	—	8—	6.4 17.6
84	67.2	183.2	53	42.4	127.4	22	17.6	71.6	—	9—	7.2 15.8
83	66.4	181.4	52	41.6	125.6	21	16.8	69.8	—	10—	8.0 14.0
82	65.6	179.6	51	40.8	123.8	20	16.0	68.0	—	11—	8.8 12.2
81	64.8	177.8	50	40.0	122.0	19	15.2	66.2	—	12—	9.6 10.4
80	64.0	176.0	49	39.2	120.2	18	14.4	64.4	—	13—	10.4 8.6
79	63.2	174.2	48	38.4	118.4	17	13.6	62.6	—	14—	11.2 6.8
78	62.4	172.4	47	37.6	116.6	16	12.8	60.8	—	15—	12.0 5.0
77	61.6	170.6	46	36.8	114.8	15	12.0	59.0	—	16—	12.8 3.2
76	60.8	168.8	45	36.0	113.0	14	11.2	57.2	—	17—	13.6 1.4
75	60.0	167.0	44	35.2	111.2	13	10.4	55.4	—	18—	14.4 0.4
74	59.2	165.2	43	34.4	109.4	12	9.6	53.6	—	19—	15.2 — 2.2
73	58.4	163.4	42	33.6	107.6	11	8.8	51.8	—	20—	16.0 — 4.0
72	57.6	161.6	41	32.8	105.8	10	8.0	50.0	—	21—	16.8 — 5.8
71	56.8	159.8	40	32.0	104.0	9	7.2	48.2	—	22—	17.6 — 7.6
70	56.0	158.0	39	31.2	102.2	8	6.4	46.4	—	23—	18.4 — 9.4

Centigrade is reduced to Fahr. by
multiplying by 9, and then adding 32 and divide
— 32 for pure

2250

$$\begin{array}{r} 2550 \\ 5 \overline{) 22950} \quad (4590 \\ \underline{20} \\ 29 \\ \underline{25} \\ 45 \\ \underline{45} \\ 0 \end{array} \quad \begin{array}{r} 16.7 = \\ 15.2 \\ 16 \end{array}$$

Barley = 1250 Bu 9 18
Wheat 2500 Bu 2 18

$$\begin{array}{r} 5 \overline{) 22500} \quad (4500 \\ \underline{20} \\ 25 \\ \underline{25} \\ 0 \end{array} \quad \begin{array}{r} 16.7 \\ 15.3 \\ 50 \\ 835 \\ 16.7 \\ 2555 = 1 \end{array}$$

Barley 5 Bu 2250
Wheat 13 Bu 5720

$$\begin{array}{r} 15.3 \\ 62 \\ 306 \\ 168 \\ \hline 9486 = \end{array} \quad \begin{array}{r} 153 \\ 80 \\ 9180 \end{array}$$

23:18:34

23-18,34

View of Palace and Park from the Trocadéro.

REPORT.

To the Executive Board

of the Illinois State Agricultural Society:

GENTLEMEN: On the 14th day of February, 1866, you appointed me your delegate to attend and report upon the Universal Exposition to be held in Paris, France, during the year 1867. At the same time, by resolution, you requested the Governor of this State to appoint and commission me as the representative of the State on the same occasion; to which request, when communicated to him by your President, Governor Oglesby responded by issuing the commission desired, accompanied by a letter of instructions. Believing my duties in the two positions would not be inconsistent with each other, I accepted both, thus tendered, with grateful acknowledgments, which I now beg to renew in the first paragraph of this report.

The obligations thus assumed have been discharged to the best of my humble ability, except that it still remains to me to communicate the results to you and to the General Assembly.

The letter of instructions referred to above contemplated an exhibition, by the State itself, of at least such a series of the fossils and useful minerals of Illinois as should sufficiently illustrate the stratigraphical and economic geology of the State, already collected in duplicate by the State Geologist. It was soon, however, determined to enlarge the scope of this exhibit, and to invite contributions from patriotic citizens interested in every department of Natural History, as well as of Agriculture and Industry. Accordingly, as early as the 1st of April, 1866, copies of the following Circular were distributed throughout the State:

ILLINOIS AND THE FRENCH UNIVERSAL EXPOSITION.

With the approval of His Excellency, Governor Oglesby, and the Executive Board of the State Agricultural Society, it has been determined to present at the Exhibition of the Industry of All Nations, to be held in Paris, France, in 1867, the best obtainable collection of facts and specimens illustrating the natural resources and elements of mineral, agricultural, commercial and manufacturing wealth and prosperity abounding in this State, with a view to placing within easy reach of the better classes of Europeans, and in the best possible form, some of the evidences of the superior advantages offered by the State of Illinois as a place of residence, to those who contemplate becoming citizens of this Republic. Other States have wisely established "Bureaus of Emigration," and their Commissioners will be present and active during the Universal Exposition; but it is believed there is no way in which the minds of those in Europe who are interested in the question of emigration to America can be more favorably impressed than by means of just such an Exhibition as the one now proposed, and for which the necessary space in the palace has already been secured.

It is earnestly hoped that private exhibitors, competing for the prizes to be awarded, will fairly and creditably represent the artistic and inventive skill, as well as the manufacturing enterprise, of our citizens; and it is, therefore, intended to make up the collection on behalf of the State, chiefly of the following:

LOT 1. A complete suite, correctly classified and labeled, of the MINERALS and FOSSILS in possession of the GEOLOGICAL SURVEY, comprising specimens from every formation and from nearly every county in the State.

LOT 2. Distinct from the foregoing, a full series of samples of all the USEFUL MINERALS, CHOICE BUILDING STONE and POTTERS' CLAYS.

LOT 3. A collection illustrating the BOTANY of the State, and including samples of all the indigenous woods and their FRUITS.

LOT 4. Samples of choice varieties of INDIAN CORN, fall and spring WHEATS, pasture and meadow GRASSES, HEMP in the stalk and fibre, FLAX in the stalk and fibre, COTTON, WOOL, TOBACCO, NATIVE WINES and SUGAR.

Accompanying the collection there will be the best maps extant, showing the DISTRIBUTION of MINERAL WEALTH, the RAILROAD SYSTEM, (complete and projected,) WATER COMMUNICATIONS, tables of STATISTICS, estimates of WATER POWER, of MINERAL RESOURCES, etc., etc. Also, copies of REPORTS of the STATE GEOLOGIST, of the STATE AGRICULTURAL SOCIETY, STATE HORTICULTURAL SOCIETY, CHICAGO BOARD OF TRADE, SUPERINTENDENT OF PUBLIC INSTRUCTION, and of the ADJUTANT GENERAL. There will also be added, if obtainable, a *well-bound copy* of every DAILY, WEEKLY, MONTHLY and QUARTERLY PUBLICATION issued in this State, and covering a period not exceeding one year preceding the 1st of November next; all of which books, maps and papers will be accessible to parties wishing to consult them during the continuance of the Exposition, and at the close *exchanged* for European publications of value for the STATE LIBRARY. Will publishers in the State advise the undersigned as to whether they will furnish the desired copies of their papers, delivering them at the office of the *Prairie Farmer*, Chicago, before the 1st November?

TO OFFICERS OF RAILROAD AND EXPRESS COMPANIES.

The entire collection included in lots 1, 2, 3 and 4 will be brought together at the State Fair, to be held in Chicago, commencing September 24th, preparatory to arranging, packing and shipping it to New York, where it must arrive by December 1st. Many of the packages will be small and light—some of them, perhaps, more bulky, and weighing 200 pounds each. Will you transport articles designed for this collection, and addressed to the undersigned at the Fair Grounds, Chicago, *free of charge*, and not, as in other cases, require prepayment of freight? The Illinois Central Railroad Company has already consented to do so.

Will you send me, addressed to Springfield, a copy of sectional diagram of your road, showing the grades, and such other facts and figures bearing upon the topography of the country over which it passes, as may be in your possession? Please reply at your early convenience.

TO PROPRIETORS OF QUARRIES.

You are particularly desired to have specimens prepared of each variety of BUILDING STONE, eight inches square and two inches thick, polishing one side where it will receive a polish, labeling each with the name of the proprietor and location of the quarry. Pack them carefully in a

suitable box, fasten the top on with *screws*, and ship them to the undersigned, State Fair Grounds, Chicago, from 15th to 20th September next.

Proprietors of *coal mines* are requested to select samples of their coal, in the form of a cube, eight inches square, (two from each mine,) label, pack, and ship as above. It is desirable to have at least one specimen from every mine in the State. The localities will be plainly marked on accompanying maps.

TO FARMERS.

Those having *choice* samples of corn are earnestly solicited to select ten ears of each variety, wrap them well in soft, dry paper, separately, put each variety in a wrapper by itself, labeled with the name of the variety, and the name and address of the producer; pack the whole in a box firmly, and ship as above.

Those having very superior fall or spring wheat are requested to send samples in quantities of one quart each, in sacks labeled with name of variety, and name and address of producer; box and ship as above.

The remainder enumerated in Lot 4 will be obtained in some other manner.

As has been stated, the entire collection, except the printed matter, maps, etc., etc., will be on exhibition at the State Fair, and we trust will form an interesting feature of that Exhibition, so that the remaining two months may be employed in supplying deficiencies, and making desirable additions, before shipping it finally to Paris.

Every intelligent citizen of the State should feel himself personally called upon to do whatever he may to render this collection as complete and attractive as it is possible to make it; and any information, suggestion or contribution to that end will be gratefully received and promptly acknowledged.

JOHN P. REYNOLDS,

Com'r for Ill. and Del. State Ag. Soc. to French Expos'n, 1867.

SPRINGFIELD, April 5, 1866.

P. S. Application for space for those wishing to exhibit on their own account should be made at once by letter addressed to J. C. Derby, Esq., Agent French Exposition, No. 5 Spruce street, New York.

The Exposition will be opened April 1, and closed October 31, 1867. Articles intended for exhibition must be entered now, but should not be shipped to New York before 1st December next.

A competent person will place the State Collection on exhibition in Paris at the proper time.

The response was all that could have been reasonably expected. Free transportation for all articles designed to become part of the State Collection for the Universal Exposition was accorded by all the railway and express companies of the State, while the Illinois Central Company, in addition, paid the salary and expenses, to the amount of about \$500, of a special agent to make collections; furnished him passes over their lines, as did also the other railroad companies, for that purpose; provided storage room in their Land Department Building at Chicago; instructed their station agents to aid in making the collections, especially of agricultural products; and exhibited on all occasions, and in every practicable manner, a lively interest in the enterprise.

The State Geologist, Prof. Worthen, prepared a valuable suite of fossils and minerals from the State Cabinet, and another of fossils from his private collection. Chiefly through the efforts of the special agent, who was furnished a list of localities, the geological collection was supplemented with good samples of coal

from most of the worked mines, building stone from the principal quarries of the State, as also the clays, earths and sand used in manufacture. The Chicago Academy of Sciences contributed a collection of Illinois game birds; private citizens and State officers added samples of agricultural products, useful minerals, agricultural implements, manufactured articles, preserved meats, wines, flour, books, maps, photographs, copies of daily, weekly and monthly papers, Reports of the Superintendent of Public Instruction, State Geologist, Auditor, and Treasurer, and of the State Agricultural Society—forming the chief part of the original State Collection proper. Other articles—among them the important exhibits of the American Cottage, the Western School House, and Diagram of the Chicago Tunnel, due almost entirely to the patriotic and well-directed personal efforts of Col. Jas. H. Bowen, one of the United States Commissioners, residing in Chicago—were subsequently added.

While this collection was sadly defective in some particulars, wanting almost entirely in the crowning and peculiar glory of our prairie agricultural industry—labor-saving farm implements—it was nevertheless respectable, and by reason of the unfortunate failure of our sister States to do as well, either of which might have readily excelled it, it assumed from the first, and maintained throughout the Exposition, the first rank as a State Exhibition from the United States. The suitable provision made by the General Assembly, and the wide discretion given me by the Governor, enabled me to make the most of the situation, and to reap for the State the legitimate reward of diligence, without unfairness or illiberality toward other States or their representatives. In this connection, it may be pardonable to quote the following paragraphs from a report* recently made to the Indiana State Board of Agriculture by Joseph Poole, Esq., a member of that Board, summing up his views and opinions derived from a month's observation at the Exposition. The compliment he has been pleased to pay to our State Collection is stated, as will be seen, in strong terms; but it comes from a gentleman of acknowledged ability and practical common sense, not a resident of this State, and who made his stay in Paris as part of an extended tour of observation devoted to the study of European agriculture

*See Transactions Indiana State Board of Agriculture, 1867.

and industry; and withal willing to believe it not wholly unmerited, I venture to reproduce here a part of his remarks on this subject:

“The Illinois corn, wheat and other grains, her minerals, her hams, salted meats, reapers and mowers, plows, farm wagons, and numerous other products, and especially her Illinois farm and Western school houses, were all viewed with wonder and admiration by the inhabitants of the whole civilized world. Illinois and her productions will long be remembered by the inhabitants of all foreign countries; and when any of those inhabitants may determine to emigrate—to leave their own country, and find an asylum and pleasant home in the United States—if they have visited the Paris World’s Exposition, when determining what State shall be their future home, and, reflecting upon the representation of each State and her products, will remember the display of Illinois with pleasing emotions; and those reflections will often determine their course, and that of their friends and associates. The expenditure of seven thousand dollars by Illinois is worth more than fifty thousand dollars to her; and I have no doubt that emigration alone will more than bring that amount into her borders in the next eighteen months, aside from the great value of settling her vast territory. She, to-day, in the eyes of the world, scarcely stands second to any State in the Union; and her minerals, grain, mowers and reapers, farm wagons, school and farm house homes, and other productions, will long be remembered by all civilized nations.”

Until within a few years past, this great agricultural district, which we call incorrectly the “North-West”—it being really far east of the middle of United States territory—was a *terra incognita* to the great majority of even intelligent Europeans; more entirely so, perhaps, than is now Eastern Russia to intelligent Americans. True, our chief sea-board marts were known; but in the minds of many, New York stood for America, and the great valley of the Mississippi River and tributaries, with its immense capabilities for the maintenance of hundreds of millions of people in a condition of comfort and even luxury, as compared with the over-crowded districts of old Europe, entered even into the dreams of but few. Later, the stream of immigration pouring in upon us, quickened in some degree by the well-directed efforts of State Commissions of Emigration established in Europe by some of the new States and by our Federal agents and ministers abroad, has reacted upon communities in the fatherland, through correspondence, and the return visits of native Europeans, so that a more general intelligence in regard to the United States begins to manifest itself among the masses. The leading, controlling idea in sending our collection was, as stated briefly in the original circular, to furnish such information in regard to the State of Illinois as would fairly present and demonstrate the attractions of this part of the Republic to the thoughtful, intelligent foreigner, and especially to the skilled laborer, in search of a country in which he might reasonably hope to better his condition. It afforded me, time and again, during five months’ almost daily

attendance on the Exposition, in the American Section, the greatest satisfaction to witness the eagerness with which this information was sought, and the gratification with which our samples of cereals and other agricultural products, and of our mineral wealth, were examined. The exhibit we did make, meager though we know it to have been, in comparison with what we of Illinois or the citizens of any other North-Western State might have done, was seemingly accepted by foreigners as a confirmation of all they had heard in eulogy of our natural resources, far more full and complete than the recent emergence of this country from a civil war of unparalleled proportions warranted them in expecting. I therefore most sincerely believe that Mr. Poole's estimate of the effect of the impression made on the minds of visitors, and of the resulting benefit to the State in the early addition of money wealth and desirable citizenship from the Old World, is not in the least exaggerated.

I shall have occasion, in a subsequent page of this report, to refer to the leading articles of the collection again, to enumerate the awards of the juries to them, respectively, and will not anticipate further now than to say that everything went forward in good time, and reached Paris before the opening of the Exposition, except the buildings, which were delayed at Havre.^w

Leaving this city on the 18th of February, 1867, and New York on the 23rd of the same month, by the steamship St. Laurent, of the French line established by the General Trans-Atlantic Company, I landed at the city of Brest, the extreme western point of France and of ^{the} Continental Europe, (lat. 48 deg., 23 min., 22 sec. N.,) on the following 5th of March, having made the ocean trip in about ten days and a half. Not being enamored of life aboard an ocean steamer by this first experience, I cheerfully waived my right to continue on up the Channel to Havre, preferring at the same cost to take the overland direct route from Brest to Paris, and therefore disembarked at this first opportunity, on Tuesday, March 5th.

Had the time and the place been selected solely with a view to present the Old World in the strongest possible contrast to the new, they could scarcely have been more fitly chosen. New York, as I left it, and, indeed, the whole northern portion of the United States east of the Mississippi River, lay buried in snow—not a bud swollen above latitude 39 deg.; and yet here in Brest,

500 miles further north than New York City, as we steamed up the harbor, and climbed the hill to the city, the lawns and hill-sides along the quays and between the frowning fortifications were seen covered with verdure; the shrubbery of the borders in full leaf; the polyanthus, crocus, hyacinths, daffodils, cydonia japonica, and some wild flowers in bloom.

Brest itself is an old, double-walled, strongly fortified city in Brittany, of about 70,000 inhabitants. The people, Celtic in their origin, and scrupulously observant of all holidays and ceremonies enjoined or permitted by the Church of Rome, to which they adhere, were seemingly all in the streets and public grounds, holding, as I learned, High Carnival on Mardi-gras or Shrove Tuesday. The better classes, however, were merely spectators—the middle and lower being the only participants. Of them, the old, middle-aged and young of both sexes clattered along the narrow streets in their wooden shoes, singly, in pairs, in parties or processions; the chief actors bedecked in all conceivable fancy costumes, and generally masked; occasionally one of the gentler sex in male attire, and frequently the situation reversed; here a party of jolly beggars on foot, and there another on horseback or on donkeys, fantastically arrayed, and personating some mediæval monarch and his court; some singing patriotic airs or love ditties not the most refined in sentiment; no rows nor disorder, nor even an “unpleasantness,” that I saw; no one showing the invariable American indications of inebriety, yet all probably drinking freely of cheap wine or beer; the whole presenting a scene not even less difficult to describe than impossible to enact on this side of the Atlantic. Indeed, elsewhere even in Europe, except in very few places, the spectacle of so great a portion of the population of a large city given up in utter abandon to the festivities and ludicrous gaieties of the Carnival, is never in these later times to be seen. It was fortunate, therefore, at the first step on a foreign shore, to meet so favorable a moment for an introduction to the marked peculiarities in the manners and customs of the people—serving, as the scenes of the Carnival at Brest did, to create an impression, which all subsequent observation only deepened and rendered more distinct, of the existing differences in the controlling conditions which surround the people of the Old World and the New, in everything relating to their religious, political, industrial and social life.

The individual who seeks to transplant any European industry, hoping it to become established here, no matter to what department it may relate, should weigh well the fact that the principles of government, the machinery of government, the systems of labor, the requirements of agriculture, the educational and religious organizations, everything that goes right down to the foundations of society in Europe, or forms an essential part of its superstructure and inner life, is substantially without parallel here. Whatever exists there does so in obedience to and in conformity with ancestral traditions, binding customs, arbitrary law and unyielding necessity. These govern and control all productive labor of the masses, in whatever direction it may be turned: as well in the immense factories as in the little household industries; as well in the establishments and on the lines of those great railway and transportation monopolies receiving governmental "concessions," as in the dingy little back shop of a Parisian mechanic; as well on the imperial estates, or the extended domains of aristocratic wealth, as in the little vineyard of the vigneron of Champaign; and as well, too, (except, perhaps, in some of the German States,) throughout the whole of Europe, even in the Republic of Switzerland and the Constitutional Monarchy of Great Britain, as in the Empire of France.

An English lord who had become offended with his old servant, and determined to dismiss him, stated to Jock his conclusion that they must part. The only reply was, "And where will your lordship be goin'?" A very usual prize awarded at district and regional agricultural shows, in England and France, is one "to that servant who has served one master longest and most faithfully." The reply of Jock, and the offer of such a prize, disclose a condition of labor, a relation of the employed to the employer, which, if it were ever approximated in this country, could have existed only under the patriarchal institution swept away as the result of the rebellion. Hence I repeat, that whoever seeks to acclimate here anything of European growth must study well its adaptability to the genius of our institutions, and, if it be an industry, its adaptability to the habits of life, the tastes and wants of our people. It is safe to assume, as a rule, that whatever flourishes in the crowded populations, and surrounded by the cheap, employment-seeking labor of Europe, will not succeed in these North-Western States, without modification in some impor-

tant particulars. I believe there are exceptions; that there are some things of value—some branches of manufacture, for example—which they are successfully prosecuting, as the outgrowths of European necessities even, which we can do better than they, chiefly because of the greater facilities for producing or obtaining here the raw materials; but so far as my observation extends these are few, and I shall mention some of them in subsequent pages of this report, with much diffidence and distrust of my own conclusions.

Brest, then, celebrating the Carnival, in holiday costume, and given up to the hilarity of the hour, exhibited only one phase, not the most striking and remarkable, of the difference between the French people and ourselves. From that hour I resolved to try to examine carefully, to observe from my own point of view, and finally to tell you, *not, perhaps, exactly how and what it really was that interested me, judged by its own peculiar surroundings, but how and what it seemed to me.*

At 11 p. m. I took the train of the "Railway of the West" for Paris, distant 370 miles. This line is probably as perfect in all its appointments, and as well managed, as any in France. Trains, except express or special, are usually made up of three classes of cars. Each first class car is divided into three sections, not communicating one with another, and each having places for eight passengers who sit in two rows of four each, crosswise the car and facing each other. A door on either side completes the resemblance of the section to one of our old stage coaches with the middle seat removed. There is sometimes an additional half-section, called a coupé, in front, glazed on the sides and end, thus allowing an unobstructed view in all directions except the rear. The only method for warming the cars is by the use of flat metal cans, $3\frac{1}{2}$ feet long, 6 inches wide and 3 inches thick, filled with hot water, placed on the floor, two in each section, and renewed at intervals. A single small oil lamp furnishes the needed light at night, and in tunnels by day, so that all danger from fire in case of accident is thus avoided; the feet, at least, are kept warm; and Europeans, who habitually dress warmer, live in the open air more, and use less fuel in their dwellings, than Americans, do not complain of the temperature of the cars in cold weather. First class fare is very nearly the same per mile as on our roads; the rate of speed about twenty-five miles per hour, including stoppages.

There are no sleeping cars, I believe, on any of the lines in France. This road, and all others on which I chanced to travel, are ballasted in the most thorough manner, and kept in the nicest repair, so that almost the only perceptible jarring of the cars in motion is sideways, owing I think to their want of requisite length to insure steadiness.

At each crossing of another railway or even highway at the same level, an individual, usually a woman, is stationed with a flag, and at the passing of the train a gate on either side is closed. Every depot is inclosed, and all access to the train, except by employees, or by passengers who are provided with tickets, is cut off. The ticket originally purchased is shown to a guard on entering the waiting hall at the station, is retained by the traveler, and is not required to be shown again until the destination is reached, where it is given up to a guard on passing from the inclosure of the depot. The "conductor," as we know him, is nowhere to be seen or heard. This ticket arrangement accomplishes at least two desirable things: it relieves the sleepy traveler from the oft-repeated cry of "tickets," and insures to the treasury of the company the return of the entire receipts for passenger traffic. Stoppages are, as on our roads, some twenty minutes at regular stations for refreshments, and a few minutes at short intervals for way passengers and other purposes. All the locomotives I saw were coal-burners, and of the plainest possible appearance in comparison with the American. Neither engineer, fireman nor guard is protected from the inclemency of the weather by any sort of suitable covered structure, and, if transferred to the prairies of Northern Illinois in the same almost defenseless condition, could scarcely hope to live out one of our severest winter storms.

The great controlling idea of the management of railways and all other lines of public conveyance in France, seems to be the *safety of the passenger*; and the realization of this, together with the perfection of systematic management everywhere and at all times observable, induces a feeling of security to which the conscious traveler on almost any American railway or steamboat is necessarily a stranger. Accidents, involving loss of life, are of rare occurrence. Next to safety are economy, punctuality, and the assurance of a reasonable amount of comfort to passengers. To accomplish these the authority is absolute, the discipline is despotism, and the obedience correspondingly certain. Nearly all

railway structures are of iron, stone or brick ; which materials are readily obtained at low rates, the necessary labor being abundant and cheap. At most of the principal stations the trains stand under a roof, frequently glazed over the entire extent and supported by iron framework. Damaging hail-storms rarely occur, so that these structures, though light, airy and beautiful, are substantially indestructible by the elements. Railway structures of every other class, bridges, culverts, tunnels, etc., seem to be of equal durability and fine finish. The French system of railways is chiefly in the hands of six large companies—the North, East, West, Orleans, Paris and Mediterranean, and the South—forming a net-work which, when complete, will afford ample facilities. The management of the respective companies exercise the most vigilant and praiseworthy care in providing for the physical and moral well-being of their employees and their families. Magazines of food and clothing supply those articles at low rates, and special schools are established and maintained for the instruction of those who desire to avail themselves of the advantages they offer. For this care the companies are amply repaid in the increased intelligence and faithfulness of their dependents, and are able to maintain an authority the most absolute, and an accountability on the part of their employees the most rigorous.

On the 1st of January, 1866, the whole number of miles of railway authorized to be constructed in France was $13,051\frac{1}{2}$; number of miles in operation was $8,433\frac{1}{2}$ —having cost 6,824,000,000 francs of which the companies paid 5,840,000,000 f. and the state 984,000,000 f. In 1865, the total number of passengers transported was 84,025,516, and tons of merchandise 34,019,436. Total receipts for passengers, 184,215,213 f.; total receipts from all sources, 578,856,871 f.; total expenses of operation, 266,202,095 f.; total number of employees, 111,460.

It is claimed that within the past ten years progress has been realized in the largely increased power of locomotives ; the substitution of coal for coke by means of smoke-consumers ; the use of more spacious and comfortable carriages ; the greater assurance of safety by means of improved modes of communication between the agents of the trains and the passengers, of the signal discs and in the brakes ; in the substitution of cast-steel plates for iron in the manufacture of steam generators. It is also sought to substitute iron for wood in the carriages, car frames and cross ties. The

cost of locomotives in 1855 was $2\frac{10}{100}$ f. per kilogramme (1 lb = 0.453 kilo.), or about two pounds; now, they cost $1\frac{75}{100}$ f. per kilo. In 1855, the price of rails at the factory was 320 f. per ton; now, it is 185 f. per ton—a diminution in cost of fixtures for railways attributable largely to important inventions in methods and processes of manufacture. By the adoption of what is known as the “Bessemer process” (which was made a special subject of examination, and reported on at length by one of the United States’ Commissioners to the Exposition), rails are now produced said to equal the best cast-steel in durability, and at far less cost. The value of this “process” to railway companies and to iron and coal producing districts of the United States, can scarcely be over-estimated, as I trust private enterprise will make manifest in this State at an early day. In railway enterprises, as in nearly all others of magnitude affecting the public welfare, the state has devoted large sums as subsidies to warrant their prosecution. The ocean steamer lines and beet sugar industry afford notable examples of the beneficial results of this policy.

To the Geologist, as well as the Agriculturist, the route from Brest to Paris is full of interest and would amply reward a prolonged study. The upheavals and disturbance of the strata are so frequent and considerable, that at one point or another every formation, from the lowest stratified rock to the post tertiary, is found at the surface. One result of this is great variety in the constituent mineral elements of the tillable soil, and a consequent ample field for experiment to determine the adaptability of the various outcrops to the growth of different agricultural products. A very able and elaborate geological survey of this line has been made, and the report embodies the results of most careful and minute observation of the agriculture pursued on and appropriate to the different exposures throughout the entire section. It is matter of doubt whether the same amount of intelligent study and labor under circumstances equally favorable, has been bestowed on a similar work elsewhere in any country; and nothing but the limited space to which it seems necessary to confine this report prevents me from inserting here at least a condensed compilation of the facts developed in the “Geological Profile from Paris to Brest, prepared by M. Mille, Chief Engineer of Bridges and Highways, Paris, 1865,” for a copy of which I am under obligations to the accomplished author. It is replete with information—scientifically

attested facts—verified by the systematic practice of agriculturists themselves for centuries but, fortunately for us, our children and our children's children, not practically applicable to any considerable extent on the smooth, virgin, undisturbed prairies of Illinois. We till no soil from which the organic matter has been washed by exposure under cultivation to the rains of a thousand years; we have no soil, or next to none, made up chiefly of the disintegrated underlying rocks and applied manures. Analyses of soils, with us, have rarely been made, and I have yet to learn that the practice of a single Illinois farmer has ever been modified by, not to say founded upon, facts in regard to the soil of his farm elicited by the means of chemical investigation. For this reason, if for no other, the whole subject of special manures, their manufacture and use, so important to European farmers, is a book with almost unbroken seals to us. Nor is it a reproach to us that it is so. An ever-present, hard necessity looks the population of all ^{the} eastern Europe squarely in the face, and demands of them the most careful examination of every element by which agriculture is in any manner affected, whether it aid or embarrass the production of human food; and so nobly and successfully have they responded to this demand, that practical art, with its economies and skill, guided by the truths of science, has steadily increased the annual production of their great staple crops, has improved the soil, and, at the same time and probably to the same extent, ameliorated the physical well-being of the mass of the people. I will not, however, be suspected of wanting in appreciation of the value of scientific research in its relation to the agriculture of our own country, nor of undervaluing the pains-taking labors of the *savans* of Europe, in expressing the conviction that the peculiarities of European agriculture, in so far as they grow out of peculiarities of soil and other conditions there present, can properly serve but as *warnings* to those who till the western prairies. If, however, we continue for a few generations more to do as we have been and are now doing—"take out of the meal tub and never put in"—we must surely find the bottom, and with it ample necessity for the practical application of the lessons in agricultural chemistry now so well studied in old Europe.

In passing over the "Railway of the West," of course no intimate knowledge of the systems of agriculture or industry in practice throughout the region it traverses could be acquired, yet there are

features, permanent and characteristic, which no American would fail to note at a glance. Some of them interested me. The physical outline of the country presents nothing remarkable. Rolling, occasionally abrupt in declivity, there is no mountain scenery nor anything not in harmony with the quiet beauty of a country almost wholly cultivated, arable lands, meadows and vineyards. The fields, separated from each other sometimes by hedges so slight as scarcely to be barriers at all and sometimes by furrows only, are small, varying from a few square rods to a few acres in extent. No laws of primogeniture or entail prevail, and hence the tendency is, as it is with us and for the same reason, to the minutest subdivision in the ownership of real estate not inconsistent with its profitable use. This has reached a point in France which is of course only in the distant future here; and the system which permits it and thus firmly binds the hearts of the people to the soil of France, is claimed by French political economists to be the palladium of French nationality. Possibly the large land owners of England, under the policy of the 'fast anchored isle' by which the small estates are being steadily absorbed, take a different view of the case.*

Perhaps the first feature of the country landscape an American will observe, because so unexpected to him in an old country having a dense population, is the prairie-like openness of the view, resulting from the absence of farm-houses with their clusters of secondary buildings which everywhere dot American scenery in the rural districts. With the exception of an occasional pretentious chateau and its accessories on the estate of some wealthy gentleman, you see nothing of the kind. Those who till the ground, whether proprietors, tenants or hired laborers, reside in adjacent villages, where each family seems to occupy the narrowest limits consistent with its actual need of shelter and rest. The farmers are villagers as well. Their dwellings may have been built fifty or a hundred or five hundred years ago; the gray stone walls, the red tile roofs or moss-covered thatch tell no story of their age. Nothing about them suggests an idea of modern or even individual

* Mr. Ernest Jones, in a lecture delivered in Dublin, August, 1867, stated, no doubt on good authority, the number of acres in England, Scotland and Wales to be 71,000,000; that the number of land owners had decreased from 250,000 in 1770 to 32,000 in 1856, and still decreases. The Duke of Devonshire owns 96,000 acres in the county of Derby alone. The Duke of Richmond owns 340,000 acres, and the Marquis of Breadalbane may ride on his own land 100 miles in a straight line from his own door—and this in a country not double the size of Illinois, with a population eight times greater!

taste. The iron rule of rigorous necessity, exacting durability and economy, seems to have prescribed their forms, materials and proportions. This same law of necessity dominates throughout.

I have already referred to the fences, or rather to the absence of them. There is no discussion of the "fence question" in France. If in the dim past any such question was raised, it settled itself long ago. One has only to look at the little pieces of ground as they lie marked into fields or farms by their different crops, the whole resembling a mammoth mosaic picture without a frame, to feel the utter absurdity of any proposition to fence them on the American system. Possibly the empire might borrow the funds to accomplish it by mortgaging the entire territory, but when done it is not likely a second loan could be effected to maintain the fences, and a considerable per cent. of the people would certainly be compelled to choose between starvation and emigration. And is it not true that here, in the sparsely timbered district of the prairies where the fences cost us originally almost as much as the land besides ten per cent interest annually to maintain them, our policy and laws on this subject are as absurd as they are onerous? Is there not in this very outgrowth of European necessity a lesson we should learn and apply? That density of population and the resultant need of economizing resources of land and money will ultimately force us to abandon the wasteful system of fencing cultivated fields, I do not entertain a single doubt; but why should not this generation reap the benefits of an enlightened policy sure to enhance the value of every acre of arable land in the prairies twenty-five per cent. on the day of its adoption?

Another economy universally practiced in France, struck me forcibly—the utilization of all available wall-surface for the production of fruit. I do not refer to the more than 5,000,000 acres of vineyards, nor to the orchards producing annually their 11,000,000 hectolitres of cider, but merely to the incidental culture of fruit against walls, barriers and other structures erected for other purposes entirely. It is, of course, not possible to estimate this product closely, but it must in France alone exceed the entire fruit crop of Illinois. There is scarcely a house owner in this State who may not profit by the suggestion; who may not, at the trifling cost of plants and the expenditure of a few minutes occasionally in pleasant labor, supply his family with an abundance of the most healthful and delicious fruits in their season. No need to delay planting

until he can build a trellis or an arbor, a time that too often never arrives, but he may use at once the bare walls of his outbuildings, his fences and even his dwelling. Generally, such surfaces produce better fruit, and with more certainty in this climate, than the open vineyard or orchard, and they are ready for use without the additional outlay of a dollar. The air of comfort, of luxury indeed, and real beauty produced in the old country by the prevalence of this practice charms an American at first sight, and almost suggests the wish that the same stern need of economy might for the time fall upon his countrymen and compel them in this simple and inexpensive manner to beautify the landscape, to furnish themselves and families with the luxury of fruits and, if money must be an element in all our calculations, add millions to the national wealth.

Of forests and tree planting, I shall speak at some length in connection with my visit to the imperial farm and nursery at LaMotte-Beauvron, and desire to refer here only to the production of fuel in a manner entirely new to me. Along the margins of brooks and on the confines of fields may be frequently seen tall trees shorn of all branches, except little tufts at their tops, and others with trunks cut off from four to ten feet above the ground. The former are Lombardy Poplars, and are shorn usually once in five years; the latter are chiefly willows, (white?) elms and birches shorn much oftener. The crops of faggots thus obtained without detriment to other crops or appreciable loss in any respect are said to supply a large proportion of the wood consumed as fuel, while the streets of the villages and cities, even the highways of the country, owe their cleanliness to the myriads of brush brooms made of the finer spray clipped from the stumps.

I must pass, however, with scarcely a mention, many other evidences of frugality revealed by a glance from the windows of the car, such as the narrowness, cleanliness and perfect keeping of streets and roads, the absence of every appearance of waste in rural economy, the studied and artistic neatness of hay and grain stacks, piles of wood, stone and coal, as also, loads of grain, hay, flax and straw as they were being transported on carts whose broad wheels serve only to roll down the metal of the McAdamized roads, without wearing them; and leave the quiet conservatism of the rural districts and their adherence to the ways of the fathers, with the single reflection that, so far as appears, ages

may have passed, revolutions swept over the land, thrones fallen and thrones risen; while the life and industries of the people in their struggle to supply the wants of a simple existence, may have undergone no appreciable change. The train bears us swiftly on towards the political, industrial, financial, commercial and scientific head and heart of the empire. It is easy to know we are approaching a great metropolis by the increasing number of telegraph wires, the improving beauty and finish of the private dwellings and grounds and even by the acres upon acres of snow-white garments of both sexes hung up to dry. Scarcely are we past the beautiful surroundings of Versailles, whose place and parks, fountains and galleries of art have cost the French people \$300,000,000, than before us, in full view in the "basin," lies Paris—with its spires and domes, its palaces, triumphal arches, old churches and monuments, its institutions of learning, its 2,000,000 of people and its Universal Exposition. It needs little knowledge of the Empire to realize how completely and perfectly "Paris is France." It has been said, "one might as well speak of what one's legs think, as of what the provinces think;" a forcible expression of the entire subjection in which Parisian influence holds the brain and muscle of the residue of the domain of Napoleon III—an influence, indeed, not wholly unfelt nor unacknowledged in the worlds of science, art and fashion throughout Christendom.

Arriving at the station, Mont Parnasse, at 4:30 P. M., March 6th, I was soon domiciled in a quiet hotel in the heart of the city, and on the following morning called on the U. S. Commissioner General, Hon. N. M. Beckwith, at his office, *No. 24 Rue de la Paix*, to make inquiry in regard to the packages addressed to me, in his care, and forming the Illinois State collection. A single interview served to satisfy me that at least one nation, whose people are known abroad as rather fast, was in danger of being behind time in perfecting its arrangements for the Exposition; and when, in the afternoon, I visited Champ de Mars and observed the little already accomplished in the American section of the palace, as contrasted with the forward condition of the preparatory work in the sections of France, England, the German States and Russia; remembering, too, that the grand opening must, under the decree of organization, take place within less than four weeks, my apprehension was not at all lessened.

As early as it was possible to do so, I obtained positions for the different parts of our collection as they arrived, and placed them as favorably, with a view to their examination by juries and visitors, as the allotted space and facilities afforded would permit. Our geological collections, agricultural products, meats, wines, and manufactured articles, were placed in time for the juries, or at least before they ceased to work; but the birds contributed by the Chicago Academy of Sciences were installed so late that I presume the jury of the class did not examine them. The botanical specimens of E. Hall, Esq., were not allotted space in which they could be properly displayed at all, and none whatever until after the jury were through and compelled to report. The Exposition contained nothing better than these two exhibits in their respective classes; and but for the delay and want of suitable position, I believe the award of a prize to each would have been secured. An unfortunate misapprehension of the scope of Class 70, on the part of the United States Commissioner General, who imagined that such representative articles of the industry of the North-Western States as salted and smoked meats, were not properly admissible under the ruling of the Imperial Commission, came near losing to us two silver medals on barreled meats, lard and hams. A timely protest, however, retained them in the palace, and a sensible jury, after proper trial at table, gave them prizes of as high grade as any awarded to similar products from other nations. In the case of the beef, pork and lard, Messrs. Culbertson, Blair & Co., of Chicago, received the *only* medal of so high grade awarded to those articles; and in case of the hams, Charles Duffield, of Chicago; Cape, Culver & Co., of New York; Bonne, who exhibited the celebrated hams of Westphalia, Prussia; and Maylan, exhibiting the almost equally noted hams of Bayonne, France, received the four highest awards—a silver medal each. Many other lower prizes were awarded to such objects, and the competition was great. It is perhaps interesting to state that the Chicago hams were regarded as rather too decided in flavor for the Parisian taste—that which constitutes their chief point of excellence with Americans, and which, by mere prolonged boiling, may of course be rendered less pronounced, even to positive insipidity.

The farm and school houses constructed by Lyman Bridges, Esq., of Chicago, installed by the Commissioner General, under the direction of J. Clark, Esq., of Chicago, were exhibited as part of the State Collection, and are quite accurately represented in the accompanying cuts, borrowed from the Prairie Farmer Company. They were delayed in transportation and erection, so as not to be completed until in June—two months after they should have been ready. The appropriate jury, having been disbanded, were reassembled, (solely by the effort of United States Commissioner Bowen, who manifested throughout the liveliest personal interest in these exhibits,) and awarded the school house a silver medal. The jury of Class 74, of which I was an associate member, and whose labors continued throughout the duration of the Exposition, finding the appropriate jury for the class in which the cottage was originally entered had also disbanded, kindly assumed to examine it, and recommended the award of a gold medal. Higher authority subsequently confirmed this action, but reduced the grade of the award to a silver medal.

A small cypress cottage from Louisiana was also awarded, by the same jury—of Class 74—a bronze medal, under precisely the same circumstances.

Every part of the State Collection possessing a market or exchangeable value has been disposed of, and the result reported to the contributors. Every article, except the birds and botanical specimens, was considered by the juries in making up their awards, and is entitled to some portion of honor in securing one of the single or collective prizes issued to the State.

The following is the official list of prizes awarded to the State and citizens of Illinois, as embodied in the Prefatory Report of the United States Commissioner General:

GRAND PRIZE.

C. H. McCormick—Reaping Machines. To this grand prize, gained in the field trials of agricultural machines, was added, by the Emperor, the Cross of Chevalier of the Legion of Honor.

GOLD MEDAL.

C. H. McCormick, Chicago—Reaping and Mowing Machines.

SILVER MEDALS.

Chicago Board of Public Works—Design of the Lake Tunnel. (State Collection.)

Culbertson, Blair & Co., Chicago—Salted Meats. (State Collection.)

Charles Duffield, Chicago—Hams. (State Collection.)

Illinois Central Railroad Company, Chicago—Agricultural Products. (State Collection.)

State of Illinois—Collection of Minerals. (State Collection.)

State of Illinois—Farmer's House. (State Collection.)

State of Illinois—Primary School House. (State Collection.)

Peter Schuttler, Chicago—Wagon. (State Collection.)

BRONZE MEDALS.

John Deere & Co., Moline—Plow. (State Collection.)

State of Illinois—Cereals and Wheat Flour. (State Collection.)

HONORABLE MENTION.

J. Hirsch, Chicago—Albumen, Glycerine, etc.

It is proper to state that, except in two or three of the ninety-five classes, (No. 74, embracing trials of agricultural implements in the field, being one of the exceptions,) the examinations and awards by the juries of the Exposition were in no proper sense *competitive*, either between nations or between individuals of the same nation. Objects regarded by the juries as worthy were so reported by them, together with an indication of the grade of prize they were believed to merit; and, so far as my knowledge extends, *distinctions were not very finely drawn in most cases*. The number of jurymen apportioned to each country exhibiting was in proportion to the space it occupied in the palace. This of course, and properly, gave France a largely preponderating influence; and to her honor it may be mentioned as an universal remark, that the Frenchmen serving on the juries acted uniformly in a spirit entirely just and even liberal, in passing upon the exhibits of other nations. I had the best possible opportunity to observe this, and it gives me great pleasure to express my admiration of their entire and perfect freedom from all narrow-minded prejudice, as well as their quick and hearty appreciation of excellence, without regard to the nationality of its origin.

An analysis of results shows that the United States received more prizes in proportion to the number of its exhibitors than any other country, except France; more than double the number received by Great Britain and her colonies. The following table, copied from the Prefatory Report of the United States Commissioner General, and verified in the main by my own examination of official documents, shows important facts in this connection. The countries compared are the ten standing highest in grade. "The lines read horizontally show the percentage of grades and

awards to each country, and the columns read vertically present the relative grades and awards to each country compared with the other countries.

	Percentage of grand prizes.....	Percentage of gold medals.....	Percentage of silver medals.....	Percentage of bronze medals.....	Percentage of honorable mentions.....	General average percentage.....
General average percentage of awards to exhibitors	0.00175	0.02221	0.08113	0.12759	0.11265	34.53
Special average:						
France	0.00306	0.04272	0.14742	0.20086	0.16166	55.57
United States	0.00932	0.03171	0.1342	0.17910	0.17250	52.79
Austria	0.00995	0.02722	0.12273	0.18194	0.14326	47.60
Prussia and North Germany	0.00226	0.02890	0.10760	0.1847	0.15028	47.40
Belgium	0.00161	0.01834	0.10118	0.15428	0.15326	43.26
Russia	0.00073	0.0158	0.06593	0.14945	0.10915	34.06
Switzerland	0.00092	0.01944	0.07500	0.11388	0.10928	31.85
Great Britain and colonies	0.00178	0.01829	0.06217	0.09531	0.08338	26.10
Italy	0.00122	0.00389	0.02826	0.06311	0.09338	19.18
Spain	0.00000	0.00794	0.02950	0.07630	0.07333	18.70

“The percentage of awards to the exhibitors of the remaining twenty-five countries falls below the preceding.”

I am more than willing to believe that the United States deserve the rank assigned them in the great Exposition of 1867 by these figures, and am gratified to know that our own State contributed respectably to secure this high national percentage; but every intelligent American who saw it will, I think, bear me out in saying the United States exhibit, as a whole, fell far below the standard of high excellence, judged by the actual ability of the country; that it did not do the nation justice; that in both *materiel* and installation, it did not realize reasonable expectations. It is due to ourselves that other nations should understand this, and I trust the special reports on this subject by United States Commissioners, with whom the duty of reporting on the American section rests, will frankly and conscientiously state the whole truth.

I turn from this department to the one more deeply interesting—the Exposition itself; and as matter of historical value, present first a brief notice of those of the same international character which have preceded it. The facts have been compiled from authentic sources.

The Exhibition of the Industry of All Nations, in 1851, was the first. It was held in Hyde Park, London, with the intention, as expressed by the late Prince Albert, "to give a true test and a living picture of the point of development at which the whole of mankind had arrived in this great task, and a new starting point from which all nations will be able to direct their future exertions." The "Crystal Palace" covered an area of 800,000 square feet, or a little more than eighteen acres—said to be more than three times the area covered by any previous exhibition elsewhere. Great Britain and her colonies occupied one-half the whole space.

It was opened by Her Majesty on the 1st of May, and closed on the 15th October—duration 141 days.

Number of exhibitors	13,937	Total number of prizes.....	5,248
Number of U. S. exhibitors.....	499	Prizes to the United States	160
Number of Council medals, 170; prize medals, 2,913; honorable mentions, 2,160.			
Number of nations exhibiting, 24.			
Whole number of visitors, 6,039,195, of whom 5,265,429 paid at the doors, £356,273, and 773,776 held season tickets, paying £67,514.			
Receipts from all sources		£506,100	
Expenditures		292,795	
Net balance.....		£213,305	
Largest number of visitors present on any one day was on the 7th October, being 109,915.			

1853.

The second International Exhibition was held in New York City, in 1853, being opened July 15th, and closed Dec. 1st.

Number of exhibitors, 4,834. Number of nations exhibiting, 24.

The Crystal Palace covered an area of 140,086.20 square feet, or 3.21 acres.

I have no other statistics at hand.

1855.

The third was held in the Palace of Industry and Annexes, Champs Elysees, Paris, in 1855. It was opened on the 1st of May, and closed on the 30th November.

Number of exhibitors	23,974	Number of prizes.....	10,564
Number of U. S. exhibitors	131	Number of prizes to U. S. exhibitors. —	
Superficial area 1,770,000 square feet, or 40.63 acres.			
Number of nations represented, 30.			
Total expenditure, 11,264,520 francs, not including the Palace of Industry, which cost about \$2,000,000.			
Total receipts, 3,202,495 francs.			

The Palace of Industry, a beautiful stone edifice, still remains, and is in frequent use for exhibitions of fine arts and public enter-

tainments requiring great space. In it was made the distribution of awards at the Exposition of 1867, July 1st, witnessed by more than 18,000 persons.

1862.

The fourth was held at South Kensington, near London, in 1862. It was opened on the 1st of May, and closed on the 15th November.

Number of exhibitors	28,653	Number of prizes	13,423
Number of U. S. exhibitors.....	128	Number of U. S. prizes.....	31
Number of nations represented, 25.			
Whole area roofed, 988,000 square feet, or 22.68 acres.			
Whole number of visitors, 6,211,103.			
Total expenditures, £460,000; total receipts, £459,631.			

1867.

On the 22nd day of June, 1863, an imperial decree was issued, at the instance of M. Rouher, then Minister of Agriculture, Commerce and Public Works, embodying the three propositions: 1. That an Exposition take place in Paris in 1867. 2. That it be more completely universal than its predecessors, and to that end, that it comprehend, as far as possible, the works of art, the industrial products of all countries, and, in general, the manifestations of all branches of human activity. 3. That the notice of this Exposition be immediately published, to the end that all producers, including those of the most distant nations, may have time to make preparation. Even before the close of the Exhibition of 1862, in London, the desire to hold another in Paris at an early day was expressed by many of the principal exhibitors, and that expression finally assumed form in the decree referred to above.

By subsequent decrees an Imperial Commission was organized, consisting of thirty-eight members, to which were added the Minister of State, the Minister of Agriculture and Commerce, the Minister of the House of the Emperor, and twenty-eight other gentlemen representing the guaranteed capital subscribed. Prince Napoleon was named President of the Exposition, but declined, whereupon the Prince Imperial was named in his place—the position being a mere formal one. M. Rouher, Minister of State, was Vice President, M. LePlay, Counselor of State, was named as Commissioner General, and M. de Chancourtois, Chief Engineer of Mines, was named as Secretary to the Imperial Commission.

The estimated expense to be provided for was twenty millions of francs, (\$3,720,000,) of which the State and the city of Paris furnished 12,000,000f., and the twenty-eight gentlemen added to the Imperial Commission, as noted above, guaranteed the remaining 8,000,000f. Champ de Mars, an oblong space, containing 784,707 square yards, (about 103½ acres,) lying on the left bank of the Seine, between that stream and the National Military School, (*Ecole Militaire*,) historical as the scene of fetes, military reviews, etc., was selected for the erection of the temporary palace.

A system of classification most admirable and exhaustive in detail was adopted by the Imperial Commission. In deciding upon the form and architecture of the palace, the controlling consideration evidently was to adapt the building to the classification, and to render a study of the Exposition, in any of its parts, or as a whole, easy and satisfactory, so far as internal arrangement of the articles exhibited could effect it. Nothing of usefulness was sacrificed to mere architectural effect. Errors of this character were avoided; the substance was not subordinated to the shadow.

The structures were therefore adapted to and contemplated an exhibition: (See map.)

I. BY NATIONS:

Each occupying a transversal section of the palace, running from the Central Garden to the circumference of the building, and larger or smaller, as respectively demanded by and originally assigned to the nations exhibiting.

II. BY GROUPS:

1. Works of art.
2. Materials and their application in the liberal arts.
3. Furniture and other objects used in dwellings.
4. Garments, tissues for clothing, and other articles of wearing apparel.
5. Products, wrought and unwrought, of extractive industries.
6. Instruments and processes of common arts.
7. Food, fresh or preserved, in various stages of preparation.
8. Animals and specimens of agricultural establishments.*
9. Living products and specimens of horticultural establishments.*
10. Objects exhibited with a view to the amelioration of the moral and physical condition of the people.†

(Each of these groups, except as noted, was extended along the line of a concentric gallery around the entire building—No. 1 being on the inner and No. 7 on the outer circle.)

III. BY CLASSES:

Of which there were ninety-five in all, suitably disposed by installations in the groups to which they respectively belonged.

*Exhibited in the Park and at the Island of Billancourt, hereafter described.

†Placed in a transversal section of the palace, without regard to nationalities, for convenience of comparative study, and in the Park.

As this matter of classification is one of growing importance and constant study, as well as of great difficulty, in all industrial organizations holding exhibitions, and as that adopted by the Imperial Commission for the Exposition of 1867 is generally admitted to be the most thorough and nearest perfection in general arrangement and specific detail yet devised, it seems highly proper to embody it herein for future reference.

SYSTEM OF CLASSIFICATION.

FIRST GROUP.—WORKS OF ART.

- CLASS 1, (Palace Gallery 1.)—*Paintings in Oil*.—Paintings on canvas, on panels, on glazing, and other surfaces.
- CLASS 2, (Palace Gallery 1.)—*Various Paintings and Designs*.—Miniatures, aquarelles, pastels, and designs of all kinds; paintings on enamel, on crockery, on porcelain; cartoons, for frescoes and for glass windows.
- CLASS 3, (Palace Gallery 1.)—*Sculptures and Engravings on Medals*.—Spherical, embossing, sculptured bas-reliefs, sculptures, pressed and chiseled, medals, cameos, engraved stones, chemical engravings.
- CLASS 4, (Palace Gallery 1.)—*Designs and Models of Architecture*.—Studies and fragments, representations and projects of edifices, restorations from ruins and from documents.
- CLASS 5, (Palace Gallery 1.)—*Engravings and Lithographs*.—Engravings (black) on copper, wood, stone, etc.; engravings in several colors; lithographs, in black, in crayon, in pencil, and in colors.

SECOND GROUP, (Palace Gallery 2.)—MATERIALS AND THEIR APPLICATION IN THE LIBERAL ARTS.

- CLASS 6.—*Specimens of Printing and Publishing*.—Specimens of typography; proof-sheets of autography and lithography, in black and in colors; proof-sheets of engravings; new books and new editions of books already known; collections of works forming libraries on special subjects; periodical publications; designs; technical and school atlases and albums.
- CLASS 7, (Palace Gallery 2.)—*Specimens of Stationery, of Book-binding, and of Materials used in Painting and Designing*.—Papers, cards, paste-boards, inks, chalks, pencils, pastels, furniture of writing desks, ink-stands, letter balances, copy-presses, etc.; registers, copy-books, albums, note-books, instrument cases, bands, elastic bands; various articles for water colors, aquarelles, colors in cakes, in bladders, in tubes, and in shells; instruments used by painters, designers, gravers, and modelers; specimens of paper work, lamp-shades, lanterns, flower-pots, etc.
- CLASS 8, (Palace Gallery 2.)—*Specimens of Design and Plastic Moulding applied in the Ordinary Arts*.—Industrial designs; designs obtained, reproduced, or reduced, by mechanical means; decorative paintings; industrial lithographs or engravings; models and rough sketches of figures, ornaments, etc.; sculptured work, cameos, locketts, and various objects ornamented by engraving; industrial medals, moulded by machines; reductions and photographs; sculptures; various objects moulded.
- CLASS 9, (Palace Gallery 2.)—*Proofs and Apparatus of Photography*.—Photography on paper, glass, wood, stuffs, enamel; heliographic engravings, lithographic proofs, photographic stereotypes, stereoscopes and stereoscopic proofs; specimens obtained by amplification; instruments, tools and materials for photography; materials and apparatus for photographic work-shops.
- CLASS 10, (Palace Gallery 2.)—*Instruments of Music*.—Wind instruments, not metallic, with simple openings, with wind-pipes, with reeds, with or without reservoirs of air; metallic wind instruments, simple, with extensions, slides, pistons, keys, key-boards; wind instruments, with key-boards, organs, accordeons; instruments with cords for compression, or for

the bow, without key-boards; instruments with cords and key-boards, pianos, etc.; instruments for percussion or friction; automatic instruments, organs of Barbary, serinettes, etc.; detached pieces and apparatus for orchestras.

CLASS 11, (Palace Gallery 2.)—*Apparatus and Instruments of the Medical Art.*—Materials and instruments for dressing wounds, sores, and for inferior surgery; instruments for medical explorations; materials and instruments for surgery; trusses and cases of instruments; cases of medicaments intended especially for army surgeons, navy surgeons, veterinary surgeons, dentists, oculists, etc.; apparatus for restoring sensation, general or local; apparatus (mechanical or plastic) de prothese, (the substitution of parts or members;) apparatus for deformities, ruptures, etc.; various apparatus for the sick, infirm, deranged; accessory objects used in the medical and surgical service, in pharmaceuticals, and in hospitals and infirmaries.

Materials for anatomical researches; apparatus for researches in medico-legal practice; special materials for veterinary medicine; apparatus for baths, medical baths, &c; apparatus for the physical exercise of children, for healthful and medical gymnastics, &c; apparatus for aid to the wounded on the field of battle, ambulances, civil and military, for armies on land and at sea.

Apparatus for aid to the drowning, suffocating, fainting, etc.

CLASS 12.—*Instruments of Precision, and Apparatus for Instruction in Science.*—Instruments used in practical geometry, compasses, micrometers, levels, micromatic lenses, calculating machines, etc.

Apparatus and instruments for surveying, for topography, for land measuring, for astronomy, etc.; apparatus for various observations; apparatus and instruments of the arts of precision, weights and measures of different countries, moneys, medals, etc.; balances; instruments for physical observations, meteorology, etc.; optical instruments; apparatus for instruction in physical science, in elementary geometry, descriptive geometry, solids and mechanics.

Models and instruments for instruction in the industrial arts in general; collections for instruction in natural sciences; figures and models for instruction in medical science, flexible anatomical models, etc.

CLASS 13, (Palace Gallery 2.)—*Geography, Cosmography, Apparatus, Maps, Charts, etc.*—Maps and atlases, topographical, geographical, geological, hydrological, astronomical, etc.; marine charts, physical charts of all sorts, flat and in relief; celestial and terrestrial globes and spheres; apparatus for the study of cosmography.

Statistical works, tables, tables and ephemerides, for astronomers and mariners.

THIRD GROUP.—(Palace Gallery 3.)—FURNITURE AND OTHER OBJECTS USED IN DWELLINGS.

CLASS 14.—*Rich Furnishings.*—Sideboards, bookcases, toilettes, beds, sofas, seats, billiards, etc.

CLASS 15, (Palace Gallery 3.)—*Upholstery and Decorative Work.*—Bedding, covered seats, canopies, curtains, hangings in tapestry and in stuffs; furniture and decorative objects in stone and other valuable materials; decorations moulded in paste, in plaster, in pasteboard; decorative painting, frames, furniture; decorative ornaments for religious service.

CLASS 16, (Palace Gallery 3.)—*Crystals, Rich Glassware and Glazing.*—Goblets in crystal, cut-glass, double crystal, mounted crystal, etc.; glass for windows, furniture and mirrors; glass figured, enameled, crackled, filigraned; optical crystals; ornamental glass-painted windows.

CLASS 17, (Palace Gallery 3.)—*Porcelain, Faience, and other Potteries.*—Biscuit, hard and tender porcelains; fine earthenware, glazed and colored; biscuit of faience, terre cuite, enameled lavas; stoneware.

CLASS 18, (Palace Gallery 3.)—*Carpets, Hangings, and other Furniture Tissues.*—Carpets, Wilton carpets, velvet tapestries; carpets of felt, of cloth, of clippings of wool, silk, or floss silk, of mat-weed, of India-rubber; furniture tissues of cotton, wool, silk, hair, vegetable leather, moleskin, leather hangings and coverings, oil-cloths, etc.

CLASS 19, (Palace Gallery 3.)—*Painted Paper.*—Papers printed on blocks with rollers, with machines, papers velveteed, marbled, veined, etc.; pasteboards, book-covers, etc.; paper for artistic uses, spring blinds, etc., painted or printed.

CLASS 20, (Palace Gallery 3.)—*Outlery*—Knives, penknives, razors, scissors, etc.

- CLASS 21, (Palace Gallery 3.)—*Goldwork*.—Goldwork for religious service, for table use and ornament, for toilettes, bureaux, etc.
- CLASS 22, (Palace Gallery 3.)—*Bronzes, various artistic castings, and works in pressed metals*.—Statues and bas-reliefs in bronze, in cast iron, in zinc; decorative and ornamental bronzes; imitations of bronze castings in zinc; castings coated with metallic coverings by the galvanic process; repousses in lead, zinc, copper, etc.
- CLASS 23, (Palace Gallery 3.)—*Clocks and Clockwork*.—Separate pieces of clockwork; spring clocks, pendulum clocks, electrical clocks, watches, chronometers, regulators, second counters, apparatuses for measuring time, hour-glasses, sand-glasses, clepsydras, etc.
- CLASS 24, (Palace Gallery 3.)—*Apparatus and methods of Warming and Lighting*.—Fireplaces chimneys, stoves, furnaces, caloriferes, accessory objects; apparatus for heating by gas, by hot water, by hot air; apparatus for ventilating and for drying, stoves; enameled lamps, blowpipes, portable forges; lamps for oil—mineral, vegetable, or animal; other accessories of lighting; apparatus for lighting by gas; photo-electrical lamps; apparatus for lighting by magnetism.
- CLASS 25, (Palace Gallery 3.)—*Perfumery*.—Cosmetics and pomatums, perfumed oils, perfumed essences, liquid extracts, scents, aromatic vinegars, almond paste, powders, pastiles and scent-bags, combustible perfumes, toilette soaps.
- CLASS 26, (Palace Gallery 3.)—*Fancy Articles, Toys, Basket-work*.—Small fancy articles of furniture, liquor cases, glove boxes, caskets, lacquer work, dressing cases, work-boxes, screens, pocket-books, purses, portfolios, cigar cases, memorandums; articles of check-work; articles turned, sculptured, engraved, of wood, of ivory, in shell, snuff-boxes, pipes, combs, brushes, corbeilles, and fancy baskets; basket-work, esparto-work.

FOURTH GROUP.—(Palace Gallery 4.)—GARMENTS, TISSUES FOR CLOTHING AND OTHER ARTICLES OF WEARING APPAREL.

- CLASS 27.—*Yarn and Tissues of Cotton*.—Cotton, prepared and spun; tissues of cotton, plain and figured; tissues of mixed cotton; cotton velvets, tapes, etc.
- CLASS 28, (Palace Gallery 4.)—*Yarn, and Tissues of Linen, Hemp, etc.*—Flax, hemp, and other vegetable fibres spun; linen and ticking; cambric, tissues of thread, mixed cotton and silk; tissues of vegetable fibres, which may be substituted for linen and hemp.
- CLASS 29, (Palace Gallery 4.)—*Yarn and Tissues of Combed Wool*.—Combed wools, tissues of combed wools, mousselines, cashmeres, Scotch cashmeres, serges, etc.; galoons of wool, mixed with cotton, or thread, or silk, or floss; tissues of hair, plain and mixed.
- CLASS 30, (Palace Gallery 4.)—*Yarns and Tissues of Carded Wool*.—Carded wool and yarn of carded wool; cloths and other tissues of wool, carded and fulled; blankets, felts of wool or of hair, for carpets, hats, socks; tissues of wool carded and not fulled or slightly fulled, flannels, tartans, etc.
- CLASS 31.—*Silk and Tissues of Silk*.—Silks, raw or milled, silk or floss thread or yarn, tissues of silk, plain and figured; silk stuffs mixed with gold, silver, cotton or wool; tissues of floss silk, pure or mixed; velvets, plushes, ribbons of silk, pure or mixed.
- CLASS 32, (Palace Gallery 4.)—*Shawls*.—Shawls of wool, pure or mixed; shawls of silk and of cashmere.
- CLASS 33, (Palace Gallery 4.)—*Laces, Embroideries, and Trimmings for Clothing, Military Clothing, Furniture, Carriages, Harness, etc.*—Laces of thread or cotton, made with the lace spindle, needle, or machines; lace of silk, wool, or of goats' hair; gold or silver lace; tulle of silk or cotton, plain or figured; tambour-work, crochet-work, etc.; embroideries in gold, in silver, in silk, in thread; tapestry embroideries, and other handwork; trimmings of silk, floss, wool, goats' hair, hair, thread, and cotton; laces, military trimmings, fine and coarse.
- CLASS 34, (Palace Gallery 4.)—*Hosiery, Linen, and other articles of Clothing*.—Stockings of cotton, thread, wool, cashmere, silk and floss, pure or mixed; garments of linen for men, women, children, baby-linen; garments of flannel, and other tissues of wool; corsets; cravats; gloves; gaiters; fans; screens; umbrellas; parasols; canes, etc.
- CLASS 35, (Palace Gallery 4.)—*Clothing for Men, Women, and Children*.—Garments for men; garments for women; coiffures for men and women, wigs and hair-work; boots and shoes; children's clothes; professional garments.
- CLASS 36, (Palace Gallery 4.)—*Jewelry and precious ornaments*.—Ornaments of gold, platinum, silver and aluminum, chiseled in filagree, or set with fine stones, etc.

Diamonds; precious stones; pearls and imitations.

CLASS 37, (Palace Gallery 4.)—*Portable Armor*.—Defensive arms—bucklers, shields, cuirasses, casques; offensive arms—war clubs, maces, bludgeons, battle-axes, etc.; foils, swords, sabres, bayonets, lances, hatchets, hunting-knives, bows, cross-bows, slings.

Fire-arms—muskets, carbines, pistols, revolvers; accessory articles—powder flasks, bullet moulds; projectiles, oblong, spherical, hollow, explosive; percussion caps, primings, cartridges.

CLASS 38, (Palace Gallery 4.)—*Articles for Traveling and for Encampment*.—Trunks, valises, sacks, bags, etc.; dressing cases, trusses, etc.; various articles, coverings, cushions, coiffures, costumes, shoes, walking sticks, parasols, etc.

Portable articles for traveling and scientific expeditions: photographic apparatus, instruments for meteorological and astronomical observations; necessities for geologists, mineralogists, naturalists, pioneer settlers; tent and camp articles; military tent furniture—beds, hammocks, folding seats, canteens, mills, ovens, etc.

CLASS 39, (Palace Gallery 4.)—*Toys and Gewgaws*.—Dolls and playthings; figures in wax; plays for children and for adults; instructive playthings.

FIFTH GROUP, (Palace Gallery 5.)—PRODUCTS, WROUGHT AND UNWROUGHT, OF EXTRACTIVE INDUSTRIES.

CLASS 40.—*Products of Mines and Metallurgy*.—Collections and specimens of rocks, ores and minerals; ornamental stones, marbles, serpentines, onyx, and other hard stones; materials difficult of fusion; earths and clays; various mineral products, raw sulphur, rock salt, salt from springs, bitumens and petroleum; samples of combustible, raw, and carbonized agglomerations of pit coal; raw metals, pig iron, iron, steel, copper, lead, silver, zinc, etc.; metallic alloys; products of puddlers, of refiners of precious metals, of gold-beaters, etc. Products of electro-metallurgy, objects coated with gold, silver, copper, steel, etc., by the galvanoplastic method.

Products of the elaboration of raw metals, moulded castings, bells, iron of commerce, iron for special uses, sheet iron, tin, extra plates for constructions and for plating ships; sheet copper, lead and zinc; wrought metals, forge work, heavy work for gates, fences, etc.; wheels, tires, tubes without solder, chains, etc.

Products of wire-mills, needles, pins, trellis work, metallic tissues, perforated plates; hardware; edge tools; ironmongery; copper, brass, plate and tin wares; wrought metal of various kinds.

CLASS 41, (Palace Gallery 5.)—*Products of the Forest*.—Specimens of different species of wood: wood for cabinet work, and for building; fire-wood, wood for ship-work, for walking sticks, for splintering; corks; textile barks; tanning, coloring, odoriferous and resinous substances, products of forest industry; roasted and carbonized wood; crude potash; articles of cooperage, basket-work, mat-work; sabots, etc.

CLASS 42, (Palace Gallery 5.)—*Products of Hunting and Fisheries, and Collections of Natural Growth*.—Collections and drawings of terrestrial and amphibious animals, of birds, of eggs, fish, cetacea, crustacea, mollusks.

Products of hunting—furs, peltries, hair, fine and coarse, feathers, down, horns, teeth, ivory, bones, shells, musk, castoreum, and similar products.

Products of fisheries—whale oil, spermaceti, whale-bone, ambergris, shells of mollusks, pearl, mother-of-pearl, corals, sponges, sepia, purple, etc.

Collections from natural growth—champignons; truffles; wild fruits; lichens for dyeing, for food, and for fodder; saps fermented; Peruvian bark, useful barks and filaments; wax; resinous gums; caoutchouc; gutta serena, etc.

CLASS 43, (Palace Gallery 5.)—*Agricultural Products (not used for food) of Easy Preservation*.—Textile materials—raw cotton; linen and hemp, dressed and not dressed; vegetable textile fibres of all sorts; wool in fleece; cocoons of silk-worm.

Products of agriculture used in manufactures, pharmacy and domestic economy—oleaginous plants, oils, wax, resins, tobacco, tinder, substances for tanning and for tinting; fodder and provender preserved.

CLASS 44, (Palace Gallery 5.)—*Chemical and Pharmaceutical Products*.—Acids, alkalies, salts of all kinds, marine salt, spring salt.

Various chemical products—wax, soap, candles, matters for perfumery, resins, tar waters, essences, varnishes, coatings, waxings; manufactures of caoutchouc, of gutta-percha; substances for dyes and colors.

Natural and artificial mineral waters—gas waters, elementary pharmaceutic substances, simple and compound medicaments.

CLASS 45, (Palace Gallery 5).—*Specimens of the Chemical Methods of Bleaching and Dyeing, of Stamping and Preparations.*—Samples of yarn and tissues, dyed; samples of preparations for dyeing; linens, printed and dyed; tissues of printed cotton, pure and mixed; tissues of printed woollens, pure and mixed, combed or carded; tissues of printed silks, pure or mixed; printed carpets, of felt or cloth; linens, painted or waxed.

CLASS 46, (Palace Gallery 5).—*Leather and Skins.*—Elementary matters employed in the preparation of skins and leather; hides, green and salt; leather, tanned, curried, prepared and dyed; varnished leather; morocco and sheep-skins; Hungary leather; chamois skins, dressed with the hair or wool on; preparations and dyes; skins prepared for gloves; peltry and furs prepared and dyed; parchments.

Articles of membrane work, cords for musical instruments, gold-beaters' skins, tendons of cattle, etc.

SIXTH GROUP, (Palace Gallery 6).—INSTRUMENTS AND PROCESSES OF COMMON ARTS.

CLASS 47.—*Apparatus and Methods of Mining and Metallurgy.*—Apparatus for boring for artesian wells and large wells; machines for drilling in mines, for digging coal, and for quarrying stone and breaking up rocks.

Apparatus for drawing electricity from mines.

Models, plans and views of works and labor in mines and quarries; ladders for mines, worked by machines; machinery for lifting from mines; machines for exhausting and pumping; apparatus for airing; ventilators, safety lamps, etc.; photo-electric lamps; apparatus for safety parachutes; signals.

Apparatus for the mechanical preparation of minerals; apparatus for the agglomeration of combustibles.

Apparatus for carbonizing combustibles; furnaces and hearths for metals; apparatus for consuming smoke; machines for metallic works; special apparatus for forges and foundries; electro-metallurgic apparatus; apparatus for the working of metals in all forms.

CLASS 48, (Palace Gallery 6).—*Implements and Processes of Rural and Forest Work.*—Plans of cultivation; divisions by nature of the soil; requisite manures and successions of crops adapted to each; materials and methods of agricultural engineering; surface draining; under draining; irrigation.

Plans and models of rural buildings; tools, implements, machines and apparatus for preparing the ground for sowing, planting and harvesting; for preserving and preparing the products of agriculture; materials for carts, wagons and apparatus for agricultural and rural transportation, for training and managing horses, etc.

Fertilizing substances, organic or mineral.

Apparatus for the chemical and physical study of soils.

Plans for replanting, cultivating and managing forests; implements of forest work.

CLASS 49, (Palace Gallery 6).—*Apparatus and Instruments for Hunting, Fishing, and for Collecting Natural Products.*—Arms, traps, snares, machines and equipments for hunting; fish-lines, fish-hooks, harpoons, nets, apparatus and bait for fishing; apparatus and instruments for gathering products obtained without cultivation.

CLASS 50, (Palace Gallery 6).—*Materials and Methods of Agricultural Works and of Alimentary Industry.*—Apparatus for agricultural work, making manures, making pipes for drainage, dairies, corn and flour trade, disposal of fecula, making starch, oil, brewing, distilling, making sugar, refining sugar; works for preparing textile fibres, silk-worm nurseries, etc.

Apparatus for the preparation of food, bread-kneaders, and mechanical ovens for bakers; utensils for pastry and confectionery.

Apparatus for making dough, for sea-biscuit, for chocolate, for roasting coffee, for ices and sorbets, and for making ice.

CLASS 51, (Palace Gallery 6).—*Chemical, Pharmaceutic and Tanning Apparatus.*—Apparatus and utensils for laboratories; apparatus and instruments for tests and experiments in industry and commerce.

Machines and utensils used in the manufacture of chemical products, soaps, candles, etc.; apparatus and processes for making essences, varnish and objects of caoutchouc and gutta-percha.

Machines and apparatus for gas-works; machines and methods for bleaching; machines and preparations of pharmaceutic products; machines and tools for work-shops, for tanning and dressing leather.

Machines and apparatus for glass-works and potteries.

CLASS 52, (Palace Gallery 6.)—*Motors, Generators and Mechanical Apparatus especially adapted to the uses of the Exhibition.*—Boilers and steam generators, with safety apparatuses; steam-pipes and accessory objects; shafts, fixed and movable; pulleys and belts; means of starting and stopping, shifting and regulating the movements of machinery; motors for furnishing water and the necessary motive power in the different parts of the palace and park.

Cranes and all sorts of apparatus proposed for the handling of packages and objects in the palace and grounds; rails and turn-tables proposed for use in the palace and park.

CLASS 53, (Palace Gallery 6.)—*Machines and Mechanical Apparatus in general.*—Detached pieces of machinery, supports, rollers, slides, eccentrics, cog-wheels, connecting rods, parallelograms, joints, belts, systems of ropes, etc.; mechanism for changing the gear of machinery, clicks, etc.; movement regulators and moderators; greasing apparatus.

Indicators and registers, dynamometers, manometers, weighing apparatus, gauges and apparatus for gauging liquids and gases; machines for handling heavy objects, hydraulic elevators, pumps, water-wheels, rams, etc.; wheel and chain buckets for irrigation, reservoirs, wheels, wheels with vertical shaft, machines à colonne d'eau. (water-pressures;) steam machinery, boilers, generators, and accessory apparatus, condensers; machines moved by the vapor of ether, chloroform, ammoniac, or by combined vapors.

Gas engines, air engines, compressed air engines; electro-magnetic motors, wind-mills, etc.; aerostats.

CLASS 54, (Palace Gallery 6.)—*Machine Tools.*—Machine tools for preparatory wood-work; turning lathes; planing and boring machines; mortising, piercing and cutting machines; screw-cutting, nut-cutting and riveting machines; various tools belonging to the yards of mechanical constructors.

Tools, machines and apparatus used in pressing, crushing, mixing, sawing, polishing, etc.; special machine tools for various uses.

CLASS 55, (Palace Gallery 6.)—*Apparatus and Methods of Spinning and Rope-making.*—Apparatus for hand-spinning; detached parts of spinning machines; machines and apparatus for preparing and spinning textile materiel.

Apparatus and methods adapted to the complementary operations, such as drawing out, winding off, twisting, milling, dressing, etc.

Apparatus for classifying and determining the condition of the threads.

Apparatus of rope-yards; round, flat and diminishing cables, rope and twine, wire cables, cables with metallic center, fuses, quick-matches, etc.

CLASS 56, (Palace Gallery 6.)—*Apparatus and Methods of Weaving.*—Preparatory apparatus for weaving; machinery for warping and for bobbins; glazing and smoothing; ordinary and power looms for plain tissues and for figured tissues; loom reeds; electrical looms; carpet and tapestry looms; mesh looms for hosiery and tulle; apparatus for making lace, for fringes and for trimmings; looms for high warping and methods of shuttling; accessory apparatus, calenders, crimping, weaving, measuring and folding machines, etc.

CLASS 57, (Palace Gallery 6.)—*Apparatus and Processes of Sewing and Making Clothes.*—Ordinary instruments for cutting and sewing, and making; machines for sewing, quilting and embroidering; tools for cutting up stuffs and leather for clothes, shoes, etc.; machines for screwing, nailing and making shoes and boots.

CLASS 58, (Palace Gallery 6.)—*Apparatus and Methods of making Furniture and Household Objects.*—Machines for veneering; saws for cutting in profile, etc.; machines for mouldings and frames, for ornamental floor work and furniture work, etc.; turning lathes, and various apparatus for joiners' and cabinet-makers' shops; machines for pressing and stamping; machines and apparatus for working in stucco, in paste-board, in ivory, in bone, in horn; machines for pointing, sculpturing and reducing statues, and for engraving and chasing.

Machines for sawing and polishing hard stones, marble, etc.

CLASS 59, (Palace Gallery 6.)—*Apparatus and Methods of Paper-making, Coloring and Stamping.*—Apparatus for stamping paper, colors and tissues; machines for engraving cylinders; apparatus for bleaching, coloring, preparing paper and tissues; apparatus for making paper in vats

and by machines; apparatus for crimping, ruling, glazing and pressing paper; machines for cutting, paring and stamping paper, etc.; apparatus and materials for letter casting, stereotyping, etc.

Machines and apparatus employed in stereotyping, mezzotinting, autography, lithography, chalcography, paniconography, chromo-lithography, etc.; printing of postage stamps; machines for composing and for classifying letters.

CLASS 60, (Palace Gallery 6.)—*Machinery, Instruments and Methods used in various Works.*—

Machinery for stamping money, for making buttons, pens, pins, envelopes, brushes, cards, capsules, for loading merchandise, and for corking and capping bottles.

Tools and methods of making lock-works, toys, ornamental boxes, baskets, etc.

CLASS 61, (Palace Gallery 6.)—*Carriage and Cart Work.*—Separate pieces of carriage and cart work, wheels, bands, axles, wheel-boxes, tires, etc.; springs, and various methods of suspension, systems of tackling and brakes; specimens of carts and vehicles for special uses, public carriages, private carriages, state carriages, hand carriages, litters, sleighs and velocipedes.

CLASS 62, (Palace Gallery 6.)—*Harness-work and Saddlery.*—Articles of harness-work, buckles, ornaments, etc.

Saddles, donkey saddles, cacolet; harness and bridles for riding, harness for draught, stirrups, spurs, whips, etc.

CLASS 63, (Palace Gallery 6.)—*Materials for Railroads and Cars.*—Separate pieces, springs, buffers, brakes, etc.

Fixed materials, rails, chairs, splices, switches, turn-tables, tenders, watering cranes, reservoirs, signals for sight and sound; rolling materials, wagons for earth-work, for merchandise, for cattle, for travelers.

Locomotives, tenders, etc.; machinery and tools of work-shops, for repairs and reconstructions.

Material and machines for inclined planes and self-working inclines.

Material and machines for atmospheric railways; models of machinery; systems of traction, apparatus applicable to iron roads; models, plans and drawings of termini, stations, sheds and out-houses, necessary to railways.

CLASS 64, (Palace Gallery 6.)—*Apparatus and Methods of Telegraphing.*—Telegraphic apparatus, based on the transmission of light, sound, etc.

Apparatus of the electrical telegraph, supports, conductors, tighteners, electrical batteries; apparatus for sending and receiving dispatches; bells and electrical signals; accessory objects for the service; lightning-rods, commutators, prepared papers for printing, and autographic transmissions; special apparatus for submarine telegraphs.

CLASS 65, (Palace Gallery 6.)—*Materials and Methods adapted to Civil Engineering, Public Works, and Architecture.*—Materials for building, wood, metals, ornamental stones, lime, mortar, cements, artificial stone, beton, tiles, brick, slate, paste-board and felt, for roofing.

Materials and specimens of preserved wood, apparatus and methods of testing materials; materials of works for embankments, excavating machines; apparatus for stone-cutters' yards; tools and methods for draughtsmen, stone-cutters, masons, carpenters, roofers, tilers, slaters, locksmiths, joiners, glaziers, plumbers, house-painters, etc.

Ornamental iron-work, locks, padlocks, railings, balconies, banisters, etc.

Materials and machines for foundation work, pile-drivers, piles, screw-posts, pumps, pneumatic apparatus, dredging machines, etc.; machines for hydraulic work, sea-ports, canals, rivers, etc.; materials and apparatus used in water-works and gas-works; materials for repairing roads, plantations and public works.

Models, plans and drawings of public works, bridges, viaducts, aqueducts, sewers, canal bridges, etc.

Light-houses, public monuments for special purposes, private buildings, hotels and houses to let, workmen's residences, etc.

CLASS 66, (Palace Gallery 6.)—*Navigation and Salvage.*—Drawings and models of ships, docks, floating docks, etc.

Drawings and models of all kinds of vessels for river and maritime navigation; types and models adopted by the navy; apparatus employed in navigation; boats and various craft; ship-chandlery; flags, signals, buoys, beacons, etc.; materials and apparatus for swimming exercises, for diving and for salvage; floats, diving bells, nautile impermeable clothing, submarine boats, apparatus for marine salvage, carrying hawsers, life-boats, etc.

SEVENTH GROUP.—(Palace Gallery 7.)—FOOD, FRESH OR PRESERVED, IN
VARIOUS STAGES OF PREPARATION.

CLASS 67.—*Cereals and other Farinaceous Edibles, with their derivatives.*—Wheat, rye, barley, maize, rice, millet, and other cereals in grain or flour; hulled grain, meal.

Farina of potatoes, rice, lentils, etc.; glutens—tapioca, sago, arrowroot, cassava, maizena and other fecula; specimens of mixed meals, etc.

Italian pastes, semoull, vermicelli, macaroni; alimentary compositions as substitutes for bread ribbon, vermicelli, pulp, domestic pastes, etc.

CLASS 68. (Palace Gallery 7.)—*Baking and Pastry Cooking.*—Various kinds of bread, with or without yeast; fancy and figured bread; compressed bread, for traveling, campaigning, etc.; sea biscuits; specimens of pastry peculiar to every nation; gingerbread and dry cakes susceptible of preservation.

CLASS 69. (Palace Gallery 7.)—*Fat Alimentary Substances, Milk, Eggs.*—Fats and edible oils, fresh and preserved milk, fresh and salt butter, cheese, various kinds of eggs.

CLASS 70. (Palace Gallery 7.)—*Meat and Fish.*—Fresh and salt meat of various kinds; meat preserved by different methods; cakes of meat, and portable soup; hams and preparations of meat; fowl and game; fresh and salt fish; barreled fish; codfish, herrings, etc.

Fish preserved in oil; sardines, pickled tunny, etc.; crustacea and shells; lobsters, prawns, oysters, preserved oysters, anchovies, etc.

CLASS 71. (Palace Gallery 7.)—*Vegetables and Fruit.*—Tubers, potatoes, etc.; dry farinaceous vegetables, beans, lentils, etc.; green vegetables for cooking, cabbages, etc.; vegetable roots, carrots, turnips, etc.; spicy vegetables, onions, garlic, etc.

Salad, curcubita, pumpkins, melons; vegetables preserved in salt, vinegar, or by acetic fermentation, sauerkraut, etc.; vegetables preserved by various methods; fresh fruits, dry and prepared fruits, plums, figs, grapes, etc.; fruits preserved without the aid of sugar.

CLASS 72. (Palace Gallery 7.)—*Condiments and Stimulants. Sugars and Specimens of Confectionery.*—Spices, pepper, cinnamon, pimento, etc.; table salt, vinegar, compound seasonings and stimulants, mustard, curry, English sauces, etc.; tea, coffee, and aromatic beverages; coffee of chiccorey and sweet acorns; chocolate, sugar for domestic use, sugar of grapes, milk, etc.

Various specimens of confectionery, comfits, sugar plums, melting plums, nougats, angelicas, aniseeds, etc.; sweetmeats and jellies, preserved fruits, citrons, cedras, oranges, apples, pineapples; brandy fruit, sirups, and sugary liquids.

CLASS 73. (Palace Gallery 7.)—*Fermented Drinks.*—Ordinary red and white wines, sweet and mulled wines, sparkling wines, cider, perry, and other drinks extracted from fruit.

Beer and other drinks drawn from cereals; fermented drinks, drawn from vegetable saps; milk and saccharine substances of all kinds; brandy and alcohol; spirituous drinks, gin, rum, tafia, kirschwasser, etc.

EIGHTH GROUP.—ANIMALS AND SPECIMENS OF AGRICULTURAL ESTABLISHMENTS.

CLASS 74. (Park.)—*Specimens of Rural Work and of Agricultural Establishments.*—Types of rural buildings of various countries; materials of stables, cow-houses, ox-stalls, kennels, etc.; apparatus for preparing food for animals, agricultural machinery in movement; steam plows, reapers, mowers, haymakers, threshing machines, etc.

Types of agricultural manufactures, distilleries, sugar mills, refineries, breweries, flour mills, fecula and starch manufactures, silkworm nurseries, etc.

Presses for wine, cider, oil, etc.

CLASS 75. (Park.)—*Horses, Donkeys, Mules, etc.*—Animals presented as characteristic of the art of breeding in all countries; specimens of stables.

CLASS 76. (Park.)—*Oxen, Buffaloes, etc.*—Animals presented as specimens of the art of breeding in each country; cow-houses and ox-stables.

CLASS 77. (Park.)—*Sheep, Goats.*—Animals presented as examples of the art of breeding in each country; types of sheepfolds, pens, and similar establishments.

CLASS 78. (Park.)—*Swine, Rabbits, etc.*—Animals presented, etc.; types of hog-pens, and structures for raising animals of this class.

CLASS 79. (Park.)—*Poultry.*—Animals presented, etc.; types of poultry-houses, dove-cotes, pheasantries, etc.; apparatus for artificial hatching.

- CLASS 80, (Park).—*Hunting and Watch Dogs*.—Shepherds' dogs, hunting dogs, watch dogs; types of kennels and apparatus for training.
- CLASS 81, (Park).—*Useful Insects*.—Bees, silkworms, and various bombyxes, cochineal, insects for producing lac, etc.; apparatus for breeding silkworms, bees, etc.
- CLASS 82, (Park).—*Fish, Crustacea, Mollusca*.—Living aquatic useful animals; aquariums, apparatus used in breeding fish, mollusca and leeches.

NINTH GROUP.—LIVE PRODUCTS AND SPECIMENS OF HORTICULTURAL ESTABLISHMENTS.

- CLASS 83, (Park).—*Hot Houses and Horticultural Materials*.—Tools for gardeners, nurserymen, and horticulturists; apparatus for watering and for dressing grass plots, etc.
Large hot houses and their accessories; small green-houses for apartments and for windows; aquariums for aquatic plants; water jets and other apparatus for ornamenting gardens.
- CLASS 84, (Park).—*Flowers and Ornamental Plants*.—Species of plants and specimens of cultivation representing the characteristic types of garden and house plants of every country.
- CLASS 85, (Park).—*Kitchen Garden Plants*.—Species of plants and specimens of cultivation representing the characteristic types of kitchen gardens in all countries,
- CLASS 86, (Park).—*Fruit Trees*.—Species of plants and specimens characteristic of the orchards in all countries; slips of forest species.
- CLASS 87, (Park).—*Seeds and Useful Forest Plants*.—Species of plants and specimens of culture indicating the methods of replanting forests in different countries.
- CLASS 88 (Park).—*Hot-house Plants*.—Specimens of the culture of various countries, with a view to utility and ornament.

TENTH GROUP.—OBJECTS EXHIBITED WITH A SPECIAL VIEW TO THE AMELIORATION OF THE MORAL AND PHYSICAL CONDITION OF THE POPULATION.

- CLASS 89, (Palace Gallery 2—Park).—*Materials and Methods of Teaching Children*.—Plans and models of school houses, of school furniture, apparatus, instruments, models, wall-maps, etc., desired for facilitating the teaching of children; elementary collections suitable for teaching ordinary science; models of designs, tables, and apparatus suitable for teaching singing and music.
Apparatus and tables for instructing the deaf and dumb, and the blind; school-books, atlases, maps, pictures, periodical publications, and journals for education.
Works of scholars of both sexes.
- CLASS 90, (Palace Gallery 2—Park).—*Libraries and Materials for Instruction of Adults, in the Family, the Workshop, the Commercial and Corporation Schools*.—Works proper for family libraries, for the masters in workshops, cultivators, commercial teachers, mariners, traveling naturalists, etc.
Almanacs, memorandum books, and other publications suitable for traveling venders.
Materials for school libraries, commercial libraries, etc.
Materials for the technical teaching necessary in certain manual pursuits.
- CLASS 91, (Palace Galleries 3, 4, and 7).—*Furniture, Clothing and Food, of all origins, distinguished for useful qualities, united with cheapness*.—Methodical collection of objects enumerated in the third, fourth and seventh groups, supplied to commerce by large factories or by master-workmen, and specially recommended by their adaptation to good domestic economy.
NOTE.—The price and place of sale should be indicated on each object.
- CLASS 92, (Palace Gallery 4).—*Specimens of Popular Costumes of Different Countries*.—Methodical collection of costumes of both sexes, for all ages, and for pursuits the most characteristic of each country.
NOTE.—Choice should be made of costumes best adapted to the respective climate, profession and peculiar tastes of each people, and which, in these respects, are most in harmony in each country with national traditions. These costumes will be exhibited, as far as possible, on lay-figures.

CLASS 93, (Park).—*Specimens of Habitations characterized by Cheapness, uniting Sanitary conditions and Comfort.*—Types of habitations for families, suitable for various classes of laborers in each country.

Types of habitations proposed for workmen belonging to manufactories in the suburbs or in the country.

CLASS 94, (Palace and Park).—*Products of all Sorts made by Master-workmen*—Methodical collection of products enumerated in preceding groups, made by workmen who work on their own account, either alone or with their families or an apprentice, for sale or for domestic use.

NOTE.—Such products only will be admitted into this class as are distinguished for their own qualities, novelty, perfection of the method of work, or by the useful influence this kind of work may exercise on the moral and physical condition of the people.

CLASS 95, (Palace Gallery 6—Park).—*Instruments and Methods of Work peculiar to Master-workmen.*—Instruments and processes (enumerated in sixth group) employed habitually by workmen working on their own account, or specially adapted to work done in the family or in the family circle.

Manual works which display in a striking manner dexterity, intelligence or taste of the workman.

Manual works which from various causes have most successfully resisted the competition of machines.

After the adoption and promulgation of the foregoing, a “New Order of Recompenses” was established by Imperial decree in favor of those persons, establishments or communities who, by an organization or special institutions, have developed entire harmony among those who are engaged in the same work, and have assured to the laborers material, moral and intellectual welfare.*

*The General Regulations, embracing the system of classification, special dispositions concerning works of art and the productions of agriculture and industry, were approved by decree dated July 12, 1865.

The following is the table of dates assigned to divers operations of the Exposition:

Table Recapitulating the dates assigned to the divers operations of the Exposition.

Dates assigned.	Nature of the operations.
Before August 15, 1865.....	Appointing committees of admission for the French section, and notifying the foreign commissions of the space granted for the productions of their countrymen.
Before August 25, 1865....	Constituting departmental committees, inviting French exhibitors, and notifying them of the space allotted in the French section to each class of products named in the system of classification.
Before October 31, 1865.....	Sending applications for admission and claims concerning admission of French exhibitors to the Imperial Commission.
Before October 31, 1865.....	Preparing and sending to the Imperial Commission, by the foreign commissioners, the plan of organization of their countrymen, drawn on a scale of 0m.002 to the metre.
Before December 31, 1865.....	Preparing detailed plans of arrangements on a scale of 0m.020 to the metre for the French section; notifying French exhibitors of their admission.
Before January 31, 1866.....	Preparing and sending by the foreign commissions the detailed plan of arrangements of their countrymen, on a scale of 0m.020 to the metre, and of information intended for the official catalogue.
Before December 1, 1866.....	Finishing the palace and the buildings in the park.
Before January 1, 1867.....	Notifying French artists of their admission.

It will probably be agreed that the above classification *does* comprehend "the manifestations of all branches of human industry," at least among civilized peoples, and so far as such manifestations could be usefully placed in view before the world at an international exhibition. Few, if any, can even read it thoughtfully without acquiring broader views of human life, its wants and resources; or without a recognition of the learning and great practical knowledge of the gentlemen who framed it.

If the classification was perfect, the structures to render its advantages practically available were not less so. The serious errors committed in the erection of the English Crystal Palace, by which the arrangement of each nation's contribution was made as an entirety, without reference to the placement of that of any other, and by which, the building being *divided into stories*, visitors were compelled to climb stairways, were both avoided in this. The whole exhibition surface was on the same level, and ample avenues, radiating and concentric, permitted the easy circulation of immense crowds on foot, and gave access to every nook and corner for old persons, invalids or others who chose to avail themselves of the licensed luxury of easy chairs on wheels. The naturalness, simplicity and adaptation of the classification, the building, and indeed the whole machinery of the exhibition, to the ends in

Before January 15, 1867	Finishing the special arrangements for exhibitors in the palace and in the park.
Before March 6, 1867	Admission of foreign products at the seaports and frontier towns indicated in article 44 of the general regulations, with permission for them to be forwarded to the Exposition, which shall be used as an actual custom-house depot.
From Jan. 15 to Mar. 10, 1867 ..	Receiving and unpacking goods in the Exposition.
From Mar. 11 to Mar. 28, 1867 ..	Arranging the goods unpacked in the spaces ascribed for them.
March 29 and 30, 1867	General cleaning of all parts of the palace and park.
March 31, 1867	Inspection of the whole Exposition.
April 1, 1867	Opening of the Exposition.
October 31, 1867	Closing of the Exposition.
Nov. 1 to Nov. 30, 1867	Removal of goods and of fixtures.

The first notice of the foregoing was received by Governor Oglesby and transmitted to me on the 27th September, 1865—obviously so late as to render an active participation by the people of this State out of the question, unless the time prescribed for presenting admission claims should be extended. By the earnest representations of Governor Oglesby and others, this was effected; although the delay in obtaining the decision, together with the failure to communicate it definitely, fully and promptly when obtained, seriously impaired its value. It is due to say in this connection that, so far as my present information extends, the Imperial Commission never, in a single instance, failed to respond favorably to an application having for its object to facilitate or improve the exhibition by citizens of the United States. If, in the preparatory work, or during the progress of the Exposition, embarrassment was encountered by any American exhibitor, I am fully persuaded it originated in his own failure to exercise due diligence, or in the lack of the requisite executive ability, address and practical intelligence on the part of the Commissioner General, to whose discretion without available appeal, our own Government had confided the administration of affairs.

view, were in essential features faultless. Whether for a six months' study in the minutest detail, or the hurried glance of a single day's walk through the many miles of aisles and galleries, nothing could be more convenient. Was it desired to look at the *whole contribution* from any one nation? it was to be found compactly together, all its parts easily reached, bearing in its *ensemble* the impress of its nationality. Was it desired to look at *articles in any one particular class* from all nations? a tour around the palace in the proper concentric gallery sufficed: the limit of space occupied by each nation being plainly marked on an over-hanging sign in view as you approached the radiating avenues on either side, and at every turn was a similar sign with an arrow indicating the direction of the River Seine. Such was the theory of the internal arrangement of the Palace, and it was adhered to in the main with marked exactness. Departures from it, occasioned by a superabundance or deficiency of objects in proportion to assigned space, were neither frequent nor extensive.

On the 25th day of September, 1865, the Imperial Commission took possession of Champ de Mars, a rough surface of $103\frac{1}{2}$ acres. The Palace proper covered about $35\frac{1}{2}$ acres. The substratum of the foundation was laid fourteen feet below the surface level; seven kilometers (four and two-thirds miles) of subterranean galleries were constructed for water-pipes, ventilators and drainage; 8,500 tons of cast and plate iron and 15,000,000 iron bolts were used in the building. One firm, furnishing 3,500 tons of the iron, employed on the work an average of 400 men per day for eight months. The two innermost and shortest galleries of the Palace were of masonry, the other seven of iron. The outer gallery, forming the great machinery nave, was 3,900 feet in length, middle line, 114 feet 10 inches wide, 82 feet high—its gracefully arched sheet-iron roof being supported by 88 ribs, resting on 176 iron pillars, which latter were 83 feet long, and weighed 2,400 pounds each. In the middle of this immense gallery, and extending throughout its entire length, was the elevated cast-iron promenade, on which the Imperial cortege made the circuit on the opening day, and which sustained the double line of shafting propelling the machinery on either side. Light was admitted through windows in the sides of this nave, which were sufficiently elevated above the adjacent portions of the Palace for the purpose. All

the other galleries received light through their glazed roofs, the intensity of it being toned down as needful by cloth suspended underneath.

The Central Garden, embellished with fountains, flower borders and a profusion of fine statuary, was a gem, the refreshing beauty of which no visitor will forget, and which many a tired sight-seer enjoyed while availing himself or herself of the cheap luxury of a chair* under the covered gallery on the border. A pavilion of tasteful architectural outline, harmonizing with the fairy-like surroundings, occupied the center of this garden, and was used for the exhibition of specimens of the moneys, weights and measures in use by the nations choosing to be represented. The object of the exhibition was to direct the attention of all to the importance of a world-wide uniformity in these fundamental elements of commercial intercourse among nations: a grand idea centrally exposed.

The water supply of the Exposition was on the basis of the quantity required by a city of 100,000 inhabitants—10,000 cubic meters per day; being 100 litres (about 25 gallons) to each person. On the heights across the Seine, called the Trocadéro—once the site of a convent garden, now owned by the State, and recently fashioned into beautiful avenues, walks and terraced slopes—was constructed a reservoir of 4,000 cubic meters capacity, 32 meters above the ground level of the Palace. This was kept filled by five powerful engines and pumps, and the water returned across the river on the Bridge of Iéna to the Park, where it was distributed throughout the Palace and grounds by means of a system of conduits of suitable capacity. The same engines and pumps also supplied a reservoir at the water-works, (No. 44 on the map of the Park,) the character of which was concealed by the mimic ruins of an old tower, from the base of which latter fell a cascade to the lake below. The main pipe from the upper reservoir, having a diameter of about 14 inches, traversed the Palace its entire length

*In all places of resort in Paris where the people frequently assemble in large numbers, such as Champs Elysées, the Garden of the Tuileries, Bois de Boulogne, and the various parks, are found, in addition to settees for the use of which there is no charge, chairs, usually of iron, with spring bottoms, which are let by women at two sous each for one sitting—the time of occupancy unlimited. The revenue from this source must be very large in the aggregate, and the custom itself would, perhaps, meet with decided favor among the women and children attending our fairs and other public gatherings, and who often suffer seriously for want of some such convenience.

to the Grand Boulevard beyond, and there branched off in a spray of lesser pipes, to supply, under a pressure equal to three atmospheres,* the fountains, fire-plugs and other demands upon the water service in the Park. At the Central Garden this main was also tapped by many small pipes running to all parts of the Palace, for use in case of fire. The water designed for drinking and for the aquariums was filtered. The original cost of these constructions was about \$40,000. The expense of their operation during the Exposition was probably defrayed by the charge of ten centimes (about two cents) per cubic meter of water furnished to such private persons and companies as demanded to use it.

Of the PARK a correct idea of the ground plan may be obtained from the accompanying map; and the student of landscape gardening will not fail to observe that in the entire plat, executed by the best artists of a nation confessedly in advance of all others in horticulture, floriculture and rural adornment, there are but two or three regular figures of the two hundred and fifty, nor even a straight line except when required by one of the two main avenues which intersect in the Central Garden; nor is any form repeated. I do not speak of the buildings, but only of the ground plan, as it came from the hands of the designer.

The boulevards, avenues and paths were all graveled and kept thoroughly rolled and sprinkled, the shrubbery, flower-beds and borders maintained in the greatest luxuriance of growth and beauty; the flowering plants were removed as they ceased to bloom, and others substituted as the season progressed.

Add to the features already noticed that the police, postal and telegraphic arrangements were faultless; that the preparations and appointments at the Island of Billancourt for the exhibition of domestic animals and special agricultural operations were all that could have been desired; that the transportation service was ample for this extraordinary occasion; and they form a masterpiece, a veritable *chef d'œuvre* of genius, learning and mechanical skill, of which any nation might be justly proud. If France had contented herself with no other exhibition than the classification, the Palace and other arrangements for the Universal Exposition of 1867, as they came from the hands of the Imperial Commission, these alone would have entitled her, in the judg-

* An elevator, carrying ten passengers to a landing on the roof about 78 feet above the ground, was in constant operation by hydraulic pressure, making the trip in two minutes.

ment of every fair-minded man cognizant of the facts and realizing the character and magnitude of the enterprise, to a position in the front rank of progressive nations. Differing as we do in opinion, *toto cælo*, with those who would sustain arbitrary government anywhere in any form, we may nevertheless recognize the moral courage of an Emperor who has dared to invite all other nations of Christendom to a comparison of their respective progress in art, science and industry, in the heart of his own Empire and under the eyes of his own people.

From what has been said, the classification and figures given, supplemented by the ground-plan and elevation, one may obtain a tolerably correct idea of the magnitude and general character of the preparatory work; of the interior and exterior of the Palace, with its concentric galleries for groups and its radiating avenues for sections; of the space occupied by each nation, and its relative position; of the Park, with its graceful subdivisions of surface, its boulevards, avenues, streets and walks, (forming, with those of the Palace, an aggregate of fifty-five miles,) its gardens, lawns and lakes. But figures and plans and words can furnish only the mere formal lines of the picture. I *would* like to show you at least the grand panorama, as it was enjoyed by thousands every bright afternoon during the summer of 1867, from the heights of the Trocadéro, facing east. In the background, on the extreme left, was Montmartre; then the cemetery of Père la Chaise; in front, the woods of Vincennes; to the right, Sèvres and the Palace of St. Cloud; in the body of the picture was the chief part of old Paris, with the dome of the Panthéon, the spires of Notre Dame, the Palace of the Tuileries, the Palace of Industry, and the Hotel des Invalides—all monumental in European history; in the fore-ground, the Palace of the Exposition, with its motley group of secondary structures from which streamed the ensigns of every nationality; still closer, the Seine, bearing upon its bosom, in gala-dress, innumerable craft burdened with gay crowds of passengers—steamers, yachts, life-boats, skiffs, flitting here and there, as business or pleasure called; the throngs of vehicles of all descriptions, from the slight velocipede to the cars of the “American Railway,”* or the scarcely less

*A horse railway, and the only one, I believe, in France. It extends from near the center of the city down the right bank of the Seine several miles.

ponderous turn-out of some resident foreign minister, covering the avenues bordering the quays of the river in front of the grand porte.

The folly of attempting to describe, in a report, or to even name in detail, the contents of the Palace and Park, if not already apparent, will be entirely so when it is stated that in the former there were twenty-five thousand tons of objects for exhibition, *exclusive of the machinery*, and that the simple catalogue covers two thousand pages, averaging more than twenty to the page. I would be glad, of course, to present you an intelligible picture of the whole; of the Park, with its gaudy array of Oriental palaces, temples, mosques, kiosques, churches, cottages, school houses, hospitals, pavilions, theater, club house, tents, stables, dairies, restaurants, cafes, bakeries, light houses, aquariums, green-houses, trees, plants, flowers, colossal statuary, steam engines, pumps, chimes of bells, bands of music, displays of military equipments, ordnance, ambulances, sanitary stores, etc., etc.; of the Palace, filled with the choicest offerings of forty-four thousand exhibitors, representing the activities of the people of every clime, their present status in science, art, education, and even their domestic life; of the veritable people themselves, from the red man of the North American forest, (the "poor Indian" and his squaw were there,) or the Egyptian sitting cross-legged on his dromedary, up through all the gradations of higher civilization and culture—so variant in appearance and diverse in manners, customs, feature, color, costume, taste, and grades of intelligence, as to stagger belief in the doctrine which asserts for the human species unity of origin. Failing in this, I shall confine myself to the special mention of a few things among the many—selecting even those few, not because of their real merit or prominence, but because my tastes or duties brought them more particularly under my notice.

For the first time, it was attempted in this Exposition to collect and arrange scientifically such monuments, land-marks and vestiges of the past as should impart, at a single comprehensive glance, a just impression of the industrial progress of the human family, from the gray twilight of civilization on the plains of Asia down to the present era—leaving to other portions of the Exposition to supply the exhibit for this century, and complete the panorama of the "History of Labor."

The classification of epochs adopted by the Imperial Commission relates exclusively to France, but is not intended to assume that the civilizing forces have produced similar development elsewhere, or that the successive eras have been everywhere identical in point of time. This is all, doubtless, it was best to attempt. Whatever diversity may exist will be well and only ascertained by comparison and study of collections, after this initiative shall have worked out its expected result by stimulating scientific research in fields promising still further discovery. A territory so isolated as Great Britain, for instance, must, in the earliest periods, have been slowly and feebly impressed by civilizing forces originating on the Continent; and hence its eras, if even characterized by similar development, may have widely differed from those of France in point of time. The French division is as follows:

First Epoch.—Gaul before the use of metal. Utensils in bone and stone, with bones of animals that have disappeared from the soil of France, but are found with these utensils—showing the age to which they belong.

Second Epoch.—Independent Gaul. Arms and utensils in bronze and stone. Objects in terra cotia.

Third Epoch.—Gaul during the Roman rule. Bronzes, arms, Gaulish coins, jewelry, figures in clay; red and black potteries, encrusted enamels, etc.

Fourth Epoch.—The Franks to the crowning of Charlemagne, (800.) Bronzes, coins, jewels, arms, pottery; manuscripts, charts, etc.

Fifth Epoch.—The Carlovingians, from the commencement of the ninth to the end of the eleventh centuries. Ivory, sculptures, bronzes, coins, seals, jewels, arms, MS., charts, etc.

Sixth Epoch.—The middle ages, from the commencement of the twelfth century to Louis XI, inclusive, (1483.) Sculpture, (statuary and ornamental,) ivory, wood, furniture, bronzes, coins, seals, jewels, arms and armor, MS. in miniature, enamels, pottery, stained glass, tapestry, embroidery, dresses, etc. [There seems to be a singular omission in the failure to enumerate *specimens of typography*. Printing was introduced into Paris in the year 1470, but is not embraced in the items for this nor indeed any other epoch.—R.]

Seventh Epoch.—The Renaissance, from Charles VIII to Henry IV, (1610.) Sculpture, (statuary and ornamental,) ivory, sculptured wood, bronzes, coins, medallions, seals, jewels, arms, cutlery, watch-making, miniatures, MS., painted enamels, varnishes, pottery, pottery called Henry II, and Bernard Palissy, glass-work, stained glass, tapestry, embroidery, buildings, etc.

Eighth Epoch.—Reigns of Louis XIII and XIV, (1610 to 1715.) Sculptures, ivories, furniture, bronzes, coins, medallions, seals, jewels, arms, watches, miniatures, MS., enamels, pottery of Nevers and Rouen, Porcelain of Rouen and St. Cloud, marquetrie, (mosaic,) tapestry, embroidery, etc.

Ninth Epoch.—Reign of Louis XV, (1715 to 1774.) Objects as in the last epoch. Varnishes, pottery, (Martin,) porcelains of Chantilly, Mennecey, Vincennes and Sévres; pottery of Moustiers, Marseilles, Alsace, Lorraine and Picardy.

Tenth Epoch.—The reign of Louis XVI and the Revolution, (1774 to 1800.)

In this, as, indeed, in almost every other class, France contributes most abundantly, occupying seven considerable halls. The relics of remotest antiquity are of course those which characterize the *age of rough stone*—tools rudely hewn by blows out of flint, resembling the arrows, axes, etc., found in America; and referred

to nomadic people who lived in France “thousands of years” prior to the time of the Celts and Gauls in the sixteenth century before Jesus Christ. Then come implements of war and the chase; still fashioned of stone, but of considerable variety, and with polished surfaces. The dawn of liberal art is signalized by drawings of natural objects on ivory. One of these is the figure of a mammoth, and is supposed to settle the question of the co-existence of the human and the species of animals, now extinct, which it represents. Then succeeds the *age of bronze*, with its improvement in the arts. The seventh century shows us manuscripts—rude enough—relating chiefly to religious subjects, and heralding that Catholicism which dominated the middle ages. The iron relics of this period are much less well preserved than the bronze. Architecture shows itself at an early period, and seems to have advanced comparatively with great rapidity.

In the middle ages, manuscripts, medals, statuettes (among them an equestrian one of the “Maid of Orleans, and which probably bears little resemblance to the original) abound. As we follow along down the stream of time, sculpture improves; pottery assumes a higher order of art; manuscripts and maps increase in numbers; tapestry, embroidery, glass-works, painting, watches, objects in silver and gold, printing, clothing, fire-arms, etc., gradually draw us to the world as it is.

The English collection, made up from the public and private museums of the kingdom, possessed more interest for me than any other, doubtless because so many of the objects were associated with personages who figured in English history. The series begins at the pre-historic period, with the rude implements common to it—warlike instruments of the time of the earlier invasions, and bronzes; then some specimens of armor, enough to convince the most skeptical that “there were giants in those days” of the middle ages; watches, plate services and wassail-bowls of mammoth proportions and elaborate workmanship; swords, helmets, miniatures of celebrated persons; religious relics; some magnificent cups given on the race-course as prizes; and a thousand other objects, admirably arranged, serving to show that England has progressed from barbarism to the position she now occupies in the world.

The exhibitions in this class by Russia, Switzerland, Portugal, Norway, Sweden, Denmark, Spain, Austria and the Low Countries

were more or less of value in determining the various problems dependent upon this sort of testimony for their solution. None was so nearly complete and full as that of France, and none more attractive to the general visitor than that of England.

Through the entire class, the ceramic art supplies a large proportion of the objects. Few relate to agriculture, whose history in earlier times, save among the Egyptians, seems to have been "written in sand." Most, especially those of France, connect themselves with successive religious developments, and appear to demonstrate that in all ages man has been governed by ideas having their source in the devotional element of his character.* The variety and profusion of weapons of war and the chase, with their successive improvements, seem to establish the fact that, from an early period, each nation or tribe has regarded itself as the one alone addressed when God gave man "dominion over the earth," and has uniformly set itself about to establish that supposed divine right as a practical reality. Clearly, by this showing, man has been a continuous worshiper, a persevering fighter, and at times a good liver; has constantly aimed at a more advanced position, and aspired to a higher life. So far as he is represented by those nations known as "enlightened," his progress has been steady and distinctly marked, as well in liberal as the useful arts—in everything relating to æsthetics. There are those who admire the "antique" in fine art; who believe, for example, that among the earlier sculptors there were some whose genius, all untaught it may be, enabled them to present the world with models of the human form which are yet without rivals from the later schools. I saw some of these master-pieces, and long rows of antique sculpture, without catching the inspiration evidently felt by more impressible and artistic observers. It is not difficult to understand their *historic* value, and one can in some sort sympathize with the antiquarian enthusiast as he returns to their study again and again; but to my uneducated taste they seem, like everything else of their day, not to bear comparison with the creations of recent and living artists. I would be quite as likely to mistake an Indian war-club or an Australian boome-

*Is the curious custom—quite prevalent in Paris—of *dedicating* business houses and shops of all sorts, attributable to this? One may find their signs bearing inscriptions such as the following: "To Spring-Time;" "To the Song of Birds;" "To Our Lady;" "To the Siren;" "To the Infant Jesus;" "To the Imperial Crown;" "To the Sun of Austerlitz;" "To the Little Devil of Paris;" "To the Good Eater;" "To the Good Drinker;" "To the Green Monkeys;" "To the Good Devil;" "To the Americans;" "To the United States;" and thousands similar.

rang for a needle-gun, as one of those impossible "antique" marble statues for the work of any respectable modern artist admitted to the Exposition—a remark not intended to imply a thought that the true artist's veneration for the antique in sculpture and painting savors at all of idolatry, or even sentimentalism, or that it is not warranted by the superiority of the productions of the oldest schools; but only to confess my own incompetency to criticise, and to justify my silence in regard to the exhibition in the First Group.

If the tribes and nations of to-day could be drawn up in line for review, with the specimens of their handiwork illustrative of the status of each in the arts, we should find the "Museum of the History of Labor" in its essential elements and significance reproduced. Indeed, such was the fact within the limits of Champ de Mars. Those tribes too barbarous to become voluntary were involuntary exhibitors, through their friends, the Christian missionaries, and, by their weapons of war, of torture, of the chase, their idols and utensils, exhibited a close alliance with the remote antique. With no seeming inherent aptitude to improve, and resisting all ameliorating influences from without, or too remote to have been touched by any such hitherto, they seem to have petrified about the close of the "age of stone." Every subsequent epoch had its representative *in propria persona*—starting with those nations who have invented nothing; who have not even been willing or able to adopt the inventions of others; whose habits are as they have ever heretofore been, or worse—subsisting on the bounty of nature in warm climates; who perform every operation of their meager art by hand, as their earliest ancestry did; whose commerce is the rudest trade; whose systems of government, if they can be called systems, are absolute despotisms or pseudo-theocracies; whose highest conception of decorative art is satisfied with a dazzling profusion of tinsel, coarse ornaments and bright-colored paints, and of melody by a senseless chant and horse-fiddle accompaniment; who are feeble in mind, feeble in body, and exist as nations by sufferance of the "Great Powers," who have thus far failed to agree upon a division of the spoils, or have been unwilling to assume the task of their extermination or regeneration.

As the plane of progress is ascended, the gradations and differences among nations become less distinctly marked. Whenever

the useful arts, or any of them, have been once introduced, and have made any impression whatever on the life of a people, they seem to have been certainly followed by extraordinary development in *some* direction. There were nations exhibiting one, two or three specialties, the fabrication of which they have pursued for many years, manifesting the highest perfection of mechanical skill, and yet whose entire exhibit, beyond these few articles, was unworthy a moment's consideration. Diversified industry (especially the practice of those branches of the arts most closely allied to agriculture) has its place in the midst of every people who to-day are in a much better condition than they were one hundred years ago; and the absence of it invariably stamps a nation with all the evidences of a want of national force of character approaching the dependent weakness of infancy. Illustrations of this are found among the Orientals, and they have closely allied kinsmen in Africa, in Western Europe, and in the Western Hemisphere.

The difference between the German States, France, Great Britain, the United States, and some others, is greater in kind than in degree. The industrial triumphs of the nineteenth century are shared among them. Each has accomplished marvelous progress, and excelled the others whenever and wherever circumstances in a notable degree specially favored its success; and each is pursuing its chosen career with an activity as intense as it is intelligent. It would be a vain endeavor to institute a critical comparison of the industries of such nations, hoping to weigh their merits and determine the relative value of their achievements to mankind.

Nor did the Exposition of 1867 present the basis upon which any such comparison could be fairly made, if it were even possible to find a competent jury; and this, particularly, so far as concerns the United States. The French Commission, for example, accepted about twenty thousand claims for admission by French people, and rejected probably as many more. The British Commission, with their large experience in European competitions of this character, with ample means and abundant opportunity to select, possessed telling advantages; and so of other European Commissions. On the other hand, the United States Commission were without means to justify the offer of tempting inducements or even proper facilities to exhibitors; our Government and our people were yet distracted, if not enfeebled, by the

war from which the nation had but just emerged; our manufacturers and inventors found ample employment for the exercise of their entire capital and energy in supplying the home market for their products, and hence had no pecuniary interest in searching for customers abroad; the Commission, therefore, only too glad to obtain material sufficient to fill up our allotted space, accepted nearly if not quite everything that offered. It is not detracting from the merit of what this country did present, to say that a large proportion of our exhibit was formed of objects whose excellence is not yet established in this country. Almost every thing we had there was new to the American public. In the Sixth Group, for example, except a locomotive, some scales, sewing machines, two or three reapers and mowers, a few plows, and a steam engine, scarcely anything American had previously received the indorsement of popular approbation here in America—simply, no doubt, because of its recent appearance. This absence of a national home-indorsement operated in more than one instance, as there is good reason to believe, to inspire the juries with a caution amounting to timidity, and to induce them to award prizes of lower grade, or withhold them entirely. No one familiar at all with American machinery adapted to the common arts can doubt for a moment that the space allotted to the United States in this group might have been filled with prize objects, if it had been possible to choose among those in popular use here. Hence, for the reasons stated, and perhaps others, a comparison of national progress in industrial pursuits between the first-class Powers, based on their exhibits at the Exposition, if thoroughly and fairly made, would not have done the United States justice.

Of the exhibition in the First Group, (Fine Arts,) any American may well speak modestly, in view of the results. Our very best artists were represented. Beard, Bierstadt, Church, Cropsey, Cole, Healy, Kensett, Darley, Miss Hosmer, Volk, Marshall, Halpin and others had pieces on exhibition, and yet but one of them received recognition by the juries! In no other group (taking all the classes of it) were the United States so well represented by acknowledged talent; and the inference is therefore irresistible that, judged by European standards in the several departments,* our artists have not yet attained a point of very

* Immediately following the announcement of prizes on the 1st of July, a rumor prevailed to

high excellence. Possibly there may be growing up an American school of art, which, like everything else in the New World, is impatient of restraint, and has ventured on innovations, departures from the rules of the "antique" schools, and which will in time make good its claims in the international courts of artistic genius.

The exhibition by France embraced in the five classes of this group 1,033 pieces, executed since the International Exposition of 1855 at Paris—the production of 470 artists, a large majority of whom had previously been successful competitors, and many the recipients of the much-coveted distinctions of the Order of the Legion of Honor. Such a collection, selected with inexorable discrimination by a commission of artists, from the studios, drawing-rooms, public and private galleries of the Empire, could not fail to embody the absolute master-pieces of modern art in France, or to command the critical attention of all visitors.

The British collection in this group was the production of 353 artists, and consisted of 160 oil paintings, 139 water-colors and drawings, 17 specimens of sculpture and die-sinking, and about 150 architectural designs and models and engravings on wood, stone and metals.

The other European nations were well represented. Of the grand prizes awarded, in all eight, Group I—

France received	4	Belgium received.....	1
Bavaria "	1	Italy "	1
Prussia "	1		

Of first prizes, in all fifteen,

France received.....	8	Austria received.....	1
Bavaria "	2	Spain "	1
Belgium "	2	Great Britain "	1

Of second prizes, in all twenty,

France received.....	10	Prussia received.....	1
United States "	1	Italy "	1
Great Britain "	1	Spain "	1
Belgium "	1	Switzerland "	1
Norway "	1	The Low Countries	1
Austria "	1		

the effect that the jury on oil paintings was composed in part of French artists who were themselves exhibitors and the recipients of prizes. This is incredible. The Imperial Commission could not have been ignorant of such proceeding, and certainly would not have sanctioned it. All exhibitors serving on juries, and in general, all governmental contributions were placed *hors concours*—out of competition.

Of third prizes, in all twenty-four,

France	received	10	Spain	received.....	2
Sweden	“	2	Prussia	“	1
Bavaria	“	2	Austria	“	1
Great Britain	“	2	The Low Countries	“	1
Italy	“	2	Russia	“	1

It is well to gain a knowledge of those things in which we are relatively deficient, and I have been all the more careful to state the facts in regard to the competition in the first group, because there was the field in which more than in any other the failure of American productions to come up to the foreign standard was most plainly indicated by the awards. Elsewhere throughout we received our full proportion of prizes, as shown in the table of percentage.

In the Second Group, except in class 10, instruments of music, American exhibitors achieved no special distinction. For pianos, however, Mr. Chickering, of Boston, received the Cross of Chevalier of the Legion of Honor, and the firm a gold medal. Messrs. Steinway and Son, of New York, also received a gold medal. It seemed to be conceded that the two manufacturers named had reached a point of very high excellence, and the musical tournaments kept up daily from 3 to 5 p. m. by distinguished performers on the instruments of Messrs. Steinway and Chickering served to maintain a lively interest on the part of visitors in the American section of this group, for several months.

Of printing, book-binding and stationery, the exhibitions by France and England were very remarkable. Cheap labor, the use of steam power, improved machinery, improved processes, and the use of cheaper material for paper, have of late wonderfully lowered the price and at the same time furnished a much better product in all that pertains to printing, binding, the manufacture of paper, pens and ink. In making steel pens alone, the city of Birmingham, England, uses about ten tons of steel per week.

In the Third Group the United States had little that attracted attention, while, as was to be expected, the French, English, Belgic and several other sections were marvels of showy magnificence in their displays of rich furniture, glass fabrics, tapestry, porcelains, cutlery, jewelry, time pieces, etc. The group which contained the regal tapestry of the Gobelins, the porcelains of Sévres, with the products of their rivals all over the world and which embraced,

besides these, almost every other creation for household and personal ornament, may well be supposed to have challenged the admiration of the great mass of visitors. The concentric gallery which separated this group and the next following was never otherwise than crowded during the hours of exhibition. The wealthy purchased while the poor looked on.

The value of glass manufactures in France exceeds eighteen millions of dollars annually, and the product is steadily increasing in all parts of the Empire. The finer and more costly qualities are chiefly made by hand. The materials for the manufacture are all, except lead, obtained in abundance in France. The sand from Illinois, and other western States, was not tested to ascertain its value as compared with the sand of Fontainebleau or Senlis. Other materials entering into the composition of French glass—carbonate of lime, sulphate and carbonate of soda and oxide of lead, etc., are obtainable abundantly and cheaply in the United States, and it is to be hoped the expensive luxury of French plate glass will soon find an acceptable substitute in American manufacture. I believe some enterprising gentlemen of Illinois have it in contemplation to try the experiment.

GROUP FOUR was little less attractive—its chief features possessing even more immediate interest to the mass of mankind, while the objects of luxury in classes 33 and 36, exhibited an expensive elegance quite satisfying to the most cultivated taste and largest fortune.

The Cotton manufactures of Europe experienced, as we are aware, great embarrassment during our late war, and sought their supplies of the raw material from China, India, Egypt, South America and along the Mediterranean. The ordinary price of New Orleans middling cotton in France, up to 1861, was about 18 cents per lb.; in 1864 it rose to 70 cents per lb., and on the 1st of January, 1867, was 34 cents per lb. There are in France alone about 6,250,000 spindles employed in spinning cotton, about 80,000 power looms and 200,000 hand looms. In the United Kingdom of Great Britain and Ireland there were, in 1861, in operation, 30,387,467 spindles. Number of power-looms, 399,992. The figures are much the same to-day. From 1856 to 1860 Great Britain imported from the United States 869,000,000 pounds of raw cotton, per annum. and obtained 260,000,000 pounds elsewhere. On the occurrence of our war, notwithstanding the par-

tial success of blockade runners, the scarcity became so great that a supply was sought elsewhere, and a successful effort was made to stimulate cotton production in British India, Egypt and other portions of the globe where the climate, soil and labor were supposed to be favorable. As a consequence, of the 978,000,000 pounds of raw cotton imported during 1865, only 190,000,000 pounds came from the United States, Mexico and the Bahamas, while British India alone supplied 446,000,000 pounds. Of the 1,260,000,000 pounds imported during the first eleven months of 1866, the United States furnished 474,000,000, and British India 586,000,000. It is, however, a fact conceded, that the best raw cottons produced in the United States are not equaled by any grown elsewhere. The cause of the superiority is not so plain; but the best American seed has not produced the same quality of staple when cultivated in foreign fields; so that, although dethroned at home, the American branch of King Cotton's royal family will continue to receive chief homage in the markets of the world. Two gold and one silver medals were awarded to American short staple, while, as indicating the earnestness with which the cultivation of this important fibre is encouraged, when attempted elsewhere, the government representatives of Algeria, Brazil, Egypt, British India, the Ottoman Empire and Italy, received a Grand Prize, each, for "Culture of Cotton,"—not, it will be remarked, for superiority of product.

In this group, also, were found the elegant laces, embroideries, and shawls, for the fabrication of which in a multitude of styles and forms and materials, different nations and districts are celebrated. The cases of the famous genuine India Cashmere shawls, the more beautiful and scarcely less rich Paisleys, the Norwich silk shawls of surpassing elegance, and the French and English laces, were so many centers of attraction to lady visitors of every nationality. This subject, however, is too closely allied to Group I, (Fine Arts,) to permit me to say a word in criticism. The fabrics themselves being in the highest degree *luxuries*, it is rather to be preferred that their manufacture shall not be rivaled in the United States, so long as there is need of revenue from custom duties.*

*It may, however, interest some to know facts in regard to French laces, derived from the official notice of this class by a member of the French Committee of Admission; especially as the statement is authentic, and is somewhat at variance with common opinion here on the subject.

In the manufacture of the fibres wool, flax, hemp, jute, and silk, as also of the substances which, on account of their comparative cheapness, it has been sought to substitute for them, in whole or in part, there has been enough progress made by the United States to give promise of successful competition with the rest of the world only in such fabrics as enter into common use. We may not hope to rival the cheap, skilled labor of Europe or the East in the fabrication of the most delicate, high-priced tissues which only the very wealthy can purchase until machinery adapted to their manufacture shall almost entirely supplant the hand labor now used. There is a strong tendency in this direction and except with such fabrics as pure cashmere shawls, and certain varieties of lace work which fashion requires to be made by the fingers and prefers to buy at fabulous prices merely because it is so made, there is no apparent reason why in a little while America may not produce of these goods what is now imported. It was asserted that the low-priced woolen shawls in the palace were the product of the Washington mills, Boston, which establishment received a silver medal and an honorable mention. New and improved machinery, better processes and the use of aniline as a coloring matter recently perfected have within a few years past increased the product largely, reduced the cost of manufacture and not deteriorated the quality of the fabrics.

In class 37, embracing weapons of offensive and defensive war, it will be observed the United States exhibitors received an emphatic endorsement. The large exhibition by Prussia, England,

The French laces made by use of the distaff or needle are known there under the names ·

1st. Points de France—worked by the needle, at Alençon chiefly, and hence sometimes called Points d'Alençon.

2nd. Chantilly, Bayeux and Caen—from their principal market centers, and comprising the black silk lace robes, shawls, veils, etc. Those of Bayeux are said to have reached the extreme limits of perfection.

3rd. Fonds clairs—made at Lille and Arras, from the distaff; not much in use.

4th. Valenciennes—a substantial, comparatively low-priced fabric, made chiefly at Bailloul.

5th. Points de Mirecourt—varied readily in style to the demands of fashion, greatly esteemed for general use, and much imitated in other countries.

6th. duPuy—made in immense quantity, chiefly at Auvergne, and renowned for their low price.

Two hundred thousand women and girls are employed in the manufacture of the foregoing kinds of lace-work—not continuously, however, for the industry is pursued entirely by the fire-side in the bosom of the family; the workers alternately employed in the fields, in household duties, and lace-making; at which last they earn from twenty-five to seventy cents per day, as they are less or more skillful and industrious. The *lace of the distaff* is made on a very light, portable frame, resting on the knees. A very large proportion of these fabrics is sold to the United States.

France and some others, was almost suggestive of so many attempts to intimidate each other by the show of preparation for a conflict of arms to which an indiscretion on the part of either might at any moment call them all. If there were any competitive tests of the effectiveness of the weapons on exhibition I did not learn it. The American repeating fire arms were examined by the public, including the King of Prussia and the Emperor of France, with much interest.

In the FIFTH GROUP, embracing the products, wrought and unwrought, of extractive industries, the exhibition was complete in all points—the most notable by the United States being in class 40, where the wealth of the western mines was profusely displayed. Many tons of choice specimens of gold, silver, copper, lead and iron ores, together with a fair representation of the various coal fields and forests, as also the collection of fossils from this State, inter-persed with cases of the most highly finished edge tools, formed, perhaps, the most generally attractive feature of our American section. If, however, volcanic Europe is more famous for one thing than for any other it is her mining wealth, and this opportunity to display the evidences of it was not overlooked. Russia, Sweden, Belgium, France, England, Prussia, Austria, Italy, the South American Republics, and the English Colonies, each made creditable and some of them remarkable contributions of ores and the extracted metals. In edge tools included in this class no contribution I saw was at all comparable to those exposed by the Douglass Manufacturing Company, of New York City, to which was awarded a silver medal.

It was, however, no pleasant reflection for an American witness of this enormous display, that while we have at home literally mountains of iron ore, our railroads are laid down through those mountains with European iron; and that Swedish and Russian iron are so far superior to American, either naturally or as the result of better processes of manufacture, as for many purposes to be yet used in our workshops in preference to the American product. There seems to me nothing more certain in the near future than that this dependence must cease. The consumption of iron throughout the world is enormous and increasing daily. Structures of the largest class, of whatever nature—bridges, buildings, ships, etc., etc., are demanding it in quantities beyond computation. Great Britain produced in 1865, 4,819,000 tons of pig iron,

and used about 29,000,000 tons of coal in the manufacture of pig and bar iron alone. The coal field of Illinois surpasses in extent those of Great Britain, France, Belgium and Spain combined. Millions upon millions of tons of iron ore of good quality lie within easy reach. The excellence of our coal for the manufacture of this ore is now settled by undoubted results of experiments for that purpose; and, in short, there certainly is no element lacking here for the successful prosecution of this industry in any of its numerous branches and on a scale commensurate with the demands of the rapidly growing west.

There are other articles in this group in common use with the people of the United States and for which we are unnecessarily dependent upon Europe—among them the osier willow, and especially the finer products of its manufacture. I was attracted to the examination of this subject by the facts, that the willow can be grown on any good land in this State as easily, and of as good quality as can be desired; that the wares into which it enters are used in every household; that being bulky and light and less costly in proportion to size than most other articles of commerce, the transportation alone enhances the price to the consumer at least twenty per cent.; and that, notwithstanding these things, we import an immense quantity of willow goods from France and Germany. France alone sells abroad annually about 1,600,000 pounds of osier and exports the chief part of it to the United States, having in plantation for its production more than 160,000 acres.

The advantages claimed for this culture in France* and which it will be seen would equally attach here if pursued on a system similar are:

“1st. That every landed proprietor may engage in it, as it requires neither expensive preparation nor continued residence in the country nor great care.

“2d. It harmonizes perfectly with other farm work. The osier is cut and split from November to April and is peeled in May or June, when the pressing labors of the harvest commence. Very often the farmer lacks hands for weeding and harvest because he discharges periodically in autumn a portion of the *personnel* necessary to these labors. Mining, quarrying, building in the cities and construction of railways have drawn away and retained these unoccupied farm laborers. How unfortunate then for the improvident farmer not to fix permanently, by regular and steady employment, the hands of which he has need! Wages are excessively high, the sale of his wheat does not cover the cost and when the crisis comes everything is sacrificed except himself.

“3d. The more commerce and industry are developed the more osiers will be in demand. Every one knows to what extent hampers of osier are taking the place of

* *Traité Spécial sur les Osiers*—par Louis Gossin—Paris, 1836—to which I am indebted for many facts in regard to the cultivation, etc., of the osier.

boxes for packing merchandise, because of their lightness and flexibility. Any one with a bit of a string can repair a hamper which has been used several times, while boxes must be prepared after each trip by special workmen.

"4th. The hardiness of the willows, under culture—accommodating themselves to wet soils abounding in humic acid. Damp grounds, of little value, converted into osieries often give products equivalent to those of the most fertile prairies."

The suggestion that the osier industry may be used as a profitable means of retaining permanently the help which is imperatively required at one season of the year and cannot be otherwise satisfactorily employed at other seasons, seems to me well worthy the attention of nurserymen, of large farmers, and of all who are similarly situated. Basket-making is eminently a household industry, and old and young, male and female, may readily acquire all the skill necessary to practice it when other occupation does not offer better remuneration.

The best species for manufacture are the *Salix viminalis*, *Salix rubra* and the *Salix vitellina*, in the order named. M. Debonnaire, of Melun (some 20 miles from Paris), claims to have originated a hybrid of superior quality. It has the appearance of yielding a larger crop than any other species I observed on his grounds or in the Exposition, and he asserts that it takes the fancy colors best—possibly only a paternal fancy.

Any soil upon which a fair crop of Indian corn can be grown will produce good osiers. Thorough preparation, by deep plowing before planting, is indispensable. Bottom lands, if even subject to overflow and not absolutely *peaty* will give good product, if previously deeply broken up so that the water will readily settle away from the roots. Grown on peaty or very wet lands the osier lacks flexibility and toughness. The ground being thoroughly prepared and convenient road-ways left for the passage of carts, the cuttings, ten or twelve inches in length, should be planted in early spring so deep that the upper bud is about at the surface, or they may be cut off with a pruning shears after setting. For use in delicate work the finest canes are produced by setting in rows about one foot apart with the plants eight inches apart in the rows. The *rubra* and *vitellina* are preferred for planting so close; the *viminalis* as well as all others, except as above, should be planted in rows two or three feet apart, with space of a foot or more between the plants in the rows; for any purpose, the longer and finer the canes the better. Such is the best practice in the French osieries, though some cultivators prefer greater distance.

The only after-culture required is weeding ; and this should be well and faithfully done or the quality and quantity of the product will be injuriously affected. The canes of the first year's growth should be cut off at the surface of the ground with a very sharp bill-hook the following spring, and each succeeding year at any convenient time between October and April ; always being careful to cut only the young wood and as near the surface of the soil as possible. It sometimes occurs in light soil that this annual cutting enfeebles the plants to an injurious extent, in which case it will be well to give rest by leaving uncut half of the plantation one year and the other half in the year following. The two year old wood may be used for new plantations.

In regard to the space between the rows and plants in the rows, it should be borne in mind that increased distance involves increase of labor in annual cultivation without in general affording any corresponding improvement in the osier crop or its quality, and that the value of the canes depends greatly on their fineness and length, which are both secured only by close planting.

Unless the annual cutting be done with care and where the surface does not receive a deposit by occasional overflow, it may sometimes be requisite, in order to maintain the plantation in full vigor, to give it a top-dressing of good soil or well rotted manure so deep as to cover any projecting stumps of the stools. An osiery treated in this manner will last indefinitely ; if not top-dressed nor inundated it will show signs of failure in ten to fifteen years. A full crop of canes is obtained the fourth year, and this with the preceding partial crops will, in France, more than pay back the entire outlay.

The canes are used with the bark on for coarse basket-work ; peeled for ordinary and fine work ; and split usually into three equal parts and retaining the bark for cooperage. When not to be peeled or split, they are cut any time from November to April, left on the ground five or six days to dry, and then tied with two bands in large bundles preparatory to being carted off. Before tying, the canes should be sorted in three grades, the longest being from 7 to 10 feet, the average $3\frac{1}{2}$ to 6 feet, and the shortest $2\frac{1}{2}$ to $3\frac{1}{2}$ feet ; the butts should be together and on the same plane.

Those designed to be peeled are cut at the close of winter, or about the time the sap starts, tied in small bundles with a single band some eight inches above the butts, and placed upright, butt-

ends down, in clean vats of pure soft water to the depth of some 18 inches. The level of the water should not vary much; a slight covering to protect them from frost, if out of doors, is necessary; for, the sap having once started, if the circulation is stopped by cold the bark cannot be so readily detached. Nor will the sap rise so well if the water be hard and cold. The canes are sometimes cut in full sap, in which case the peeling is done at once; the first process, however, is preferred because the quality of the canes is better and by allowing plenty of time it facilitates operations on a large scale. If the peeling is to be finished in May, the canes may be placed in the water as soon as they are brought from the osiery, but if not until in June, they should be stored in a cellar and not placed in the water until within ten or fifteen days of peeling. Any which it is expected to keep to the end of June before peeling should be put in water when brought from the field, withdrawn and stored in a cellar for some time, and then again placed in the water.

Whenever the buds of the osier begin to open the peeling may be done. It is light work performed by hand; women and children do it very rapidly. I do not know whether any mechanism has yet been invented by which the operation can be well and rapidly done. The canes are drawn first by one end, then by the other through a spring vice with long jaws, fixed upright in a post at about 18 inches or two feet from the ground, the operator sitting meanwhile. The loosened bark with any bits still adhering is then readily removed by hand. The bundles of the dried canes are then made up by laying a band on the ground with the length of just four feet, exclusive of enough at the ends to twist as in binding wheat, distinctly marked; the canes almost sufficient for a bundle are then placed on the band with the butts projecting a few inches, when the band is tied or fastened by twisting so as to make the circumference of the bundle just 4 feet. Other canes are then inserted until no more can be pressed under the band when the base of the bundle is leveled by striking with a mallet and another band firmly drawn around, about half or two-thirds the distance to the top. Placing the canes straight, binding firmly, and preserving an even base, are the important points of the manipulation on which somewhat of the market value is dependent. The bundles thus prepared may be stored under shelter from rain until wanted for market or manufacture. The *Salix*

rubra and *vitellina* designed to be split may be cut in November, December or January, put in a cellar and split before they dry, or may be dried and split afterwards, as most desirable. The splitting, as I saw it done, was performed by passing the butt-end of each cane through a short tube firmly fixed, in which there were three blades extending from the center to the circumference, then seizing the cane on the other end of the tube and drawing it through, thus separating it into three equal parts.

Osier plantations are subject to injury: 1st, by *frosts* in the spring which, by injuring the young shoots, retard growth and diminish the product. There is, of course, no remedy.

2d. By attack of certain species of *snails* which are fond of the tender buds, and are particularly to be feared in first year's plantations. As no part of the northwestern United States is infested with these mollusks, which abound by myriads in France, I imagine no apprehension of ravages by them among our osieries need be felt. The remedy, however, is powdered quicklime sprinkled twice at intervals of half an hour during a fog or on the approach of a mild shower when the snails are all out feeding.

3d. By attack on the roots by the tree beetle or white worm (?)—sometimes injurious to young plantations; remedy, or rather prevention, deep spading or plowing before planting.

4th. By stings of certain insects on the upper ends of the branches (terminal buds), causing the leaves to be developed in a rose form, from which the shoots ramify and lose much of their value. No remedy known.

5th. By eating of the foliage in summer by several species of *Coleoptera*, the most dangerous being the *steel-blue* (?). Its larvæ, which are black, devour the young leaves with great avidity. The most promising remedy is sprinkling with pyritic ashes and powdered quicklime.

6th. Small excrescences or warts, the size of a pea, are produced by the puncture of an unknown insect, and, when numerous, injure the osier. No remedy known.

7th. By tramping of animals, which if permitted, will produce sad havoc. Remedy, keep everything of the sort off, except when required by cultivation or harvest.

8th. By invasion of the *bindweed* (*Convolvulus*). Remedy, prompt extirpation.

9th. By *hail* wounding the shoots and rendering them brittle at the points of injury. No remedy, of course; the only mitigation is to select for use what may have escaped.

10th. By *gun-shot wounds*—worse than hail, as far as they go. Remedy, prosecute the hunters perseveringly; for they all soon learn that osiers are splendid hiding places for quail, grouse, rabbits, etc., and the temptation to trespass is very great.

11th. The osiers are sometimes discolored—a serious evil, without remedy. The product may however be used for crates and other coarse work. It is caused by rust induced by climatic conditions not to be controlled; usually, however, confined to low situations and foggy weather.

I visited* at Mèlun, before mentioned, the plantations and factory of M. Debonnaire, who cultivates some thirty acres of osier, and employs in the different prisons of France some 400 workmen on baskets made of osier, rattan and esparto; the entire products being sold in the French markets. The rattan he buys at Antwerp, where it arrives from India, at 8 cents per pound; the esparto is a slender, flexible, tough species of rush growing wild on the poorer soils of Spain. I do not remember its cost price.

Mr. D.'s exhibition in the palace was very fine, and he kindly offered me information on every point. He entertains no doubt, whatever, of the feasibility of manufacturing such ware in Illinois profitably on any desirable scale; and expressed much anxiety to place his son in the management of such an enterprise in company with others here; the skilled labor to be furnished, as required from time to time, from the employées of his own factory.

I am strongly inclined to believe that such an industry located on the margin of any of the navigable waters of this State will result, if well managed, in great profit to those who shall prosecute it. The wholesale price of willow, rattan and esparto ware at M. Debonnaire's factory is not greater than one-fourth the retail price in Springfield, Illinois.

In noticing the exhibition of FIBRES in this same group, one is forcibly impressed with two facts, of which the evidence is written in broad, legible characters all over the face of Europe; and which the political economists, the Industrial Universities and Colleges of this country should not fail to give their due weight

* In company with W. W. Corbett and E. B. Wight, Esqrs., of Chicago.

in legislation, and in the courses of study they adopt, to-wit: that what are termed *industrial cultures*, yielding raw materials for manufactures, give far richer returns, directly and indirectly, than are derived from an equal expenditure of capital and labor in the production of what are called, in contradistinction, *commodities of consumption*; and that a nation or district may import a large proportion of the necessaries of life, and yet maintain a maximum density of population if only manufactures flourish within its boundaries. Thus the vegetable product per acre of the lower Rhine in the French province of Alsace, owing entirely to its rich industrial cultures,* exceeds largely that of Great Britain or even England alone; and there is still an excess in favor of the former when the combined vegetable and animal products of the lower Rhine and England are compared. When, however, populations are compared, we find the lower Rhine sustaining 130 and England 143 to the hectare (about $2\frac{1}{2}$ acres); and this notwithstanding the latter imports annually and pays in gold for at least 260 millions pounds of meat, 180 millions pounds of butter and cheese, 74 millions pounds of potatoes, wheat and flour sufficient for 3,000 millions pounds of bread, and, for agricultural purposes in Great Britain, 467 millions pounds of guano, 144 millions pounds of bones and animal charcoal, 176 millions pounds of oil cake, more than 3 millions hectolitres of nitrate of soda, together with more than 500 millions dollars worth of raw materials used in manufacture; deducting in all cases the quantity re-exported.

In other words, England imports subsistence for about one-third of her population (at least 6 millions out of 18,954,444 in 1865), imports almost the entire raw materials for her principal manufactures, except minerals, and by her manufacturing industry sustains a population only exceeded in density, perhaps, by one or two small provinces of Europe. The inference, to my mind, is irresistible that, in a country like the United States, where the raw materials for almost every possible branch of manufacture are found, or can be so cheaply produced, right along-side of a full supply of all the necessaries of life, the most dense population on the face of the globe can be sustained comfortably, if only manu-

* Rapport de M. Eugène Tisserand, Inspecteur général, Chef de la Division des domaines agricoles de la Couronne, Président de l'Enquête dans la 13e Circonscription. Paris, 1877.

factures and agriculture go hand in hand—if only agriculturists shall be encouraged to devote themselves to the industrial cultures in due proportion, and manufacturers shall be encouraged to establish themselves throughout this inviting field.

The scarcity of raw cotton occasioned by our late war, together with the palpable advantages to be derived, stimulated the cultivation of flax and hemp in Europe very greatly. France has planted this branch of agriculture firmly in her Algerine colonies, and extended it within her own borders.

As the result of inquiry in regard to the cultivation and handling of flax, I made notes of what appeared to be the methods likely to prove most successful here.

The *flax of Riga* (Russian) is most highly esteemed for quality of the fibre, but the seed degenerates in France, Belgium and Holland to such a degree that it is necessary to seek fresh supplies direct from Russia every second year. The *soil* is prepared for the reception of the seed by plowing once in the fall, or rather late summer, and twice in the spring, in as large lands as possible to avoid leaving numerous dead furrows—harrowing after each spring plowing and rolling after the last. The seed is then sown either drilled or broadcast, lightly harrowed and lightly rolled in. If manures are used (as they always are on the lands devoted to this purpose in either of the countries named), they should be applied after the first spring plowing, and if barn-yard manure, only in a well decomposed state. It is called an exhausting crop and requires the soil to be rich in humus. There is little doubt that any soil equal to the production of an average crop of Indian corn in this State, a deep, friable loam with a clay subsoil, is sufficiently stored with all the elements necessary for the growth of a good crop of flax. The *seed* should be of uniform color, a bright brown, shining, plump, heavy and free from any musty odor; and should weigh from 41 to 43 lbs to the bushel. The average number of seeds in a bushel of 41 lbs about 4,000,000. Before sowing, the seed should always be passed through a fanning mill and cleaned from all foreign substances, immature or imperfect seeds, and especially from every other sort of seed. No other crop suffers more severely from the presence of weeds than flax, and no pains should be spared to keep them out. The *time of sowing*, from the 1st to the 15th of May. In determining the *quantity of seed per acre*, account must be taken of the quality of the soil and of the main crop

desired, whether seed or fibre. On strong, fertile soil, when seed is the object, about eighty pounds per acre is the proper quantity; when fibre, the quantity should be increased to one hundred and twenty pounds per acre. On lighter soils the amount sown might be reduced say twenty per cent. in each case. Whatever method of seeding be adopted, whether drilled or broadcast, the greatest care should be exercised to spread the seed evenly. Very much depends upon this, particularly if a beautiful, regular, even fibre is desired. Windy days should be avoided, and it is often best to sow half the seed in one direction and cross-sow with the other half. The subsequent rolling should be done when the soil will neither *pack* nor *plaster*.

In eight or ten days the plants will appear and no other labor is required until harvest, unless patches of weeds show themselves; in which case, children in their bare feet should be sent in to remove them with care, so as to disturb the growing flax as little as possible. But let the weeds be cleared out at all events.

Like every other species of vegetation, the flax is liable to climatic injury. It also sometimes suffers from the attack of an insect (a species of plant-louse), from the parasitic plant *dodder* (genus *cuscuta*), and smut. I imagine, however, drouth and hail storms are more to be feared in Illinois than insects or parasites; and thorough preparation of the soil, as we know, rarely fails to afford entire immunity from the effects of drouth. The remedy for *dodder* is simply to tear it away by hand and burn it; for smut, the use of perfectly sound seed on good soil; and for the plant-louse, scattering freely over the field wood ashes and soot.

Harvesting must be done by hand pulling, if the fibre is the principal object; there is no substitute yet, though inventors are looking in this direction; and the pulling should be done when the lower third of the stalk is turned yellow; the capsules containing the seed will also have partly changed color. If pulled earlier the fibre will be too soft and tender, and there is too much waste in dressing; if pulled later, the fibre obtained will be too dry, hard and coarse; if pulled at the time indicated, the fibre will be in the best condition, and a considerable part of the seed will be found matured. If grown for seed only, it may, of course be cut with any mowing or reaping machine in ordinary use; in which case, also, the subsequent operations of binding, shocking, stacking and threshing are well understood—there is then little value

in the straw. The pulling should be done by seizing small bunches with one or both hands, drawing them obliquely out of the ground, shaking them lightly to detach the earth from the roots, picking out from among them all weeds or other foreign matter, and depositing them in an even line on the ground, with the tops lying always in the same direction. In a little while, two or three days or more, as the weather and other circumstances may favor, the flax may be gathered into small bundles, bound loosely and cocked, as is done with oats or wheat (except that caps are not required unless the cocks are expected to remain long in the field), being careful to build the cocks firmly, not by pressing the sheaves together so much as by spreading the bases, in order that the air may circulate freely through and dry them quickly. The object is to *cure* the straw and to avoid as fully as possible any rotting or decay before that process is regularly undertaken.

When it is ascertained by inspection that the straw is cured, the crop may be hauled to a barn or elsewhere under shelter and *threshed*. The seed is detached either by drawing the upper extremities of the straw through a *ripple* (usually a row of iron teeth, 15 to 18 inches long, pointed at the top and fastened in a piece of wood) about 3-16 of an inch apart at the bottom, fixed cross-wise a bench; or by taking the straw a handful at a time, and striking the tops lightly, so as not to break the stems, with a light wood paddle—thus also at the same time bursting the capsules and avoiding any necessity of further threshing. As fast as the threshing is done the straw may be piled up in bundles under shelter, or placed where it is to undergo the process of retting. And here, if this industry were well systematized, the labor of the cultivator would end, except that he would deliver the crop in properly cured, carefully threshed bundles at the grounds of the manufacturer, where the subsequent processes of retting and dressing could usually be far better and more cheaply performed than on the farm.

Retting dissolves the gummy matter which causes the textile fibre to adhere to the woody matter of the straw and prevents the separation of the two by breaking and scutching. It is a delicate operation. The process of fermentation must be continued, under proper conditions, just long enough to dissolve this gum, or there will be great waste, and no longer, or there will result a serious injury to the quality of the fibre.

If the retting be done in *running water*, the bundles may be placed in covered vats securely anchored in the bed of a stream, and entirely submerged, with numerous small apertures at either end, so that the water may run regularly and evenly through in all parts. A small spring of pure water (water not charged with salt or other injurious chemicals) may be used by imbedding the vats properly, far enough from the source for the temperature of the water to be modified by the air, or filling a supply-pond some days previous to depositing the bundles. The straw must be subjected to the action of pure water, of moderate temperature, without intermission until the process is complete. This will occur during the season from July to October inclusive, in 4 to 15 days. Whenever the fibre can be easily detached the whole length of the stem, the retting is finished; and this is ascertained only by constant watching, frequently withdrawing a few stems, drying and breaking them. The bundles are then taken out, unbound, spread out on a green-sward and thoroughly dried—the quicker the better.

If *dew-retting* be resorted to, it may be done by placing the straw after threshing, thinly and evenly on green-sward or meadow, where it should lie some seven to nine days, and then be turned with a wooden fork; after lying six or eight days longer the retting will be complete, and this is ascertained by trial as before. On a large scale, and in establishments prepared for the work retting may be done at any season of the year, the vats being under shelter and the temperature regulated by steam. Dew-retting never yields a fibre so free from discoloration or so valuable in other respects as water-retting.

Further preparation of the fibre is now done by machinery quite as well as it was ever done by hand.

For *breaking* flax, the machine of Sanford & Mallory seemed to perform its work as rapidly, as thoroughly, with as little waste and with as little expenditure of power as any I saw tested at Billancourt, where it had many rivals. Being of American manufacture (exhibited, however, by an English firm), it is easily obtained here and is well known.

The simplest, and in my judgment, the best *scutching* machine on exhibition was one shown by M. Jh. Pernollet, 116 Rue St. Maur Popincourt, Paris. The scutching is effected by six elastic paddles projecting beyond the circumference of a wheel; the flax,

in suitable quantities, being presented through a horizontal slot in a board standing upright close to the revolving paddles. The machine is operated by one man who also handles the flax, or it may be attached to any power and the speed regulated by suitable gearing. The price in Paris is \$40.

There are also combined Breaking and Scutching Machines, of which one manufactured by Messrs. John Rowan & Sons, of Belfast, Ireland, is highly esteemed by competent judges in Ireland. It has, I think, been introduced into Canada. The price is about \$120.

The profits of flax culture depend, of course, largely on circumstances not under the farmer's control. In Belgium, in some portions of France and of Italy, a fibre is produced which enters into the composition of an endless variety of silk goods, and is worth, when prepared for manufacture, from 4,000 to 6,000 francs per ton (\$800 to \$1,200). From this, as the extreme, the price falls to a minimum of perhaps \$100 per ton—as low as a tolerably fair article of scutched flax is ever sold in this country (U. S.) It is safe to expect a crop of 8 to 12 bushels of seed and 250 to 400 pounds of scutched flax per acre.

Owing to causes well understood, flax and wool have of late been steadily supplanting cotton in the manufacture of many tissues for clothing, and so far as is apparent, there is no reason to believe this tendency will not continue until still more important results are reached. The area on which cotton can be profitably cultivated, even with cheap labor and under other circumstances of heavy demand, etc., is at best quite limited. Flax is profitably grown now from Algeria to northern Russia, and may be grown almost wherever civilized man chooses to live; from the tropics up well towards the poles.

For flax in different stages of preparation, gold medals were awarded to citizens of Russia, Belgium, Algeria and France; silver medals to citizens of France and Belgium; bronze medals to citizens of France, Belgium, Holland, Russia, Italy, Great Britain, Austria, Canada and Algeria.

Of SILK in cocoons there was a good show from Spain, Turkey, France, Algeria, Austria, Greece, Portugal and Equador. The only notable improvement in silk culture of recent adoption and promising important results is the system of isolating the worms

while they spin their cocoons and deposit their eggs, by means of portable, cellular frames, the cells being of proper size for a single cocoon each. In substituting this for the old methods double cocoons are avoided; the eggs of each worm are deposited by themselves and can be more easily examined to determine their soundness; even temperature and better ventilation are secured; and in short most, if not all, the old maladies and causes of disease and injury to the worms and the cocoons surely avoided. The invention, together with the most elaborate details of experiments made for a series of years, have been placed before the silk-growing public and have caused quite a sensation. The silk industry has of late felt serious embarrassment by reason of disease among the worms and consequent short crop of the fibre, and the inventor of this "new system for the rearing of silk worms," M. DelPrino, of Alexandria, Italy, was awarded by the jury in class 74 (where the apparatus was exhibited) a gold medal. Should it result on further trial, as claimed by the inventor, that silk culture with this system "becomes only a useful family amusement unattended with labor" we may possibly find it in time flourishing in this country on a more substantial basis than when the *multicaulis* fever prevailed.

Of HEMP there was, of course, a fine exhibition in all stages of preparation and manufacture, and by all the principal nations except the United States. The most beautifully prepared hemp was from Italy, samples of which I obtained. So far as I could learn, there is no process by which a superior fibre is obtained, that is not understood the world over. There is no reason to believe that American grown hemp may not be rotted, broken and dressed so that the fibre shall equal in appearance and in every desirable quality the best European. Care in every step of growth and subsequent manipulation, as with flax, will secure the best results.

WOOL. The sheep is a true cosmopolite; his home is everywhere in habitable climes; and nearly every nation participating in the Exposition brought samples of his fleece. Beyond all question, the Prussian wool-room, filled with elegant cases of specimens from the world-renowned flocks of that kingdom—the walls hung with oil paintings and photographs of the most noted animals—presented the most beautiful, complete and unique exhibition of this important interest in the Palace. The Central Agricultural

Society of Silesia, at Breslau; Lehman, of Nitsche; Thaer, of Moeglin; Bruenneck, of Bellschwitz; Hoffschlager, of Weisin; Baron Maltzahn, of Lenschow; Baron Elsner de Gronow, of Kalinowitz, and others—more than one hundred exhibitors in all—had evidently spared neither time nor expense to get up a most elaborate show in the most attractive style. The effect was far beyond any previous conception I had entertained; and by the courtesy of Dr. Louis Wittmack, of Berlin, who represented the Prussian Minister of Agriculture, as well as the Commissioner General of Prussia at the Exposition, I was enabled, not only to examine in detail this entire collection, but to obtain samples of the wool from almost every contribution. These samples, now on your shelves, you have already seen—and they fairly represent all the different grades of wool produced in Prussia, and, indeed, with few exceptions, all the desirable grades grown anywhere.

The French exhibition of wool was not quite so striking at first view, because not so well arranged nor nearly so extensive; nor were the individual contributions so elaborately or expensively displayed.

General Girod, of Chevy; Godin, of Chatillon-sur-Seine; Gilbert, of Videville; Graux, of Mauchamp, and some twenty others, together with the Imperial Farms, including the well known Rambouillet wool, made up a splendid exhibition.

These two, the French and Prussian taken together, contained samples of the esteemed varieties peculiar to the continent of Europe, as well as all those of acknowledged merit in Great Britain; so that it is not necessary in what I have to say on wool and sheep to go beyond these collections to find anything not already familiar to every one in this country who has given attention to recent publications on this general subject. Neither shall I repeat for the thousandth time what may be found in almost every "Essay on Sheep and Wool," in regard to the origin, character and history of the numerous races of sheep now acclimated in this country; all this has its interest and value, but its repetition here would be of little service. For the sake of brevity, only such facts and opinions will be stated as are supposed to bear on the production and manufacture of wool in this country.

In all the samples exhibited in the Palace and among those I saw elsewhere, there were but three, or at most four, varieties possessing desirable qualities which may not be readily duplicated

from the flocks of Illinois. These were the *Negretti*, of Prussia—the best staple for the manufacture of the finest broadcloths; the *Merinos of Naz*, of France—quite similar in all important respects; the *Mauchamp*, of France—an exceedingly lustrous, silky fibre, resembling Angora goat's wool, and of an average length of about four and a half inches or possibly five; and the *Rambouillet*, a French merino *de laine wool*, having in general a fine staple of three to four inches in length. Of the first and last named races there have been importations into the United States, and their blood is mingled with that of others in what we call *American Merino*, so that in some of our large flocks it would not be difficult to find fleeces and animals closely resembling both the *Negretti* and *Rambouillet*. It seems to me to be entirely feasible for any shepherd of good judgment to make selections from the flocks already here, known as *French*, *Spanish* and *American* merinos, and by breeding carefully and perseveringly to produce, in all essential points of carcass and wool, either one of these two varieties. It may be that the same fineness of fibre as in the *Negretti* could not be reached and permanently fixed in this country, but for this suggestion, often made, I have not heard any good reason offered. Between the western plains and the Allegheny mountains, the northern lakes and the Gulf of Mexico, not to mention the extreme western States and Territories, there are surely to be found all the conditions of soil, climate and herbage which are present in Prussia or France; besides it is well known that at the London International Exhibition of 1851, the fine short-stapled carding wools from Tennessee and Pennsylvania attracted much attention, received prize medals and took rank in competition with England, Spain and France, next to the celebrated German wools.*

*The jury in their report say, "Mr. Cockrell.—The wool transmitted by this exhibitor, from Northville, (Nashville?) is well got up and exhibits, like the preceding specimens, (referring to the Negretti wools of Prussia.—R.) a quality of fibre indicative of care and skill in the development and improvement of the fleece, which calls for the award of the Prize Medal."

"Mr. J. H. Ewing.—The wool transmitted from Washington, Pennsylvania, by this exhibitor is remarkable for the good substance of the fleece, as well as for the quality of the fibre, and the jury award to him the Prize Medal."

The report further states, in regard to the entire exhibition of wools, "One of the able experts, whose valuable aid the jury have already acknowledged in their examinations of wools, reports "those shown by America as most approximating to the character of the German wools." "German wools" include those from Austria, Austrian Silesia, Hungary, Prussia, Saxony and Polish Silesia, and are characterized by the jury as being "pre-eminent in the qualities of highest value."

It seems to be admitted in Europe, among shepherds, that abundant nourishment will in time be followed by a thickening of the skin, an increase of carcass and a corresponding increase in the length and diameter of each individual fibre of the wool; but if this be an invariable law it is not difficult to find large districts on the summits and slopes of the Apalachian chain of mountains suited, in both climate and meagre production of the grasses, to the growth of any animal demanding little food.

The pure *Negretti*, as bred by the best Prussian breeders, is not a very small sheep, but attains an average weight for the 4 year old ram of about 140 pounds, and for the ewe, of about 110 pounds; shearing an average yearly fleece of about 6 pounds for the rams and 4 pounds for the ewes, well washed in cold water by hand. Much heavier weights than these, for both carcass and fleece, are claimed by the circulars of those who make annual sales of breeding animals, but their statements, like those of gentlemen pursuing the same industry elsewhere, are not usually under the mark. An examination of many whole fleeces, supported by other reliable testimony, lead me to believe that the figures named are about what would be realized by any one importing the sheep and taking proper care of them in this country. The flocks, however, all equally pure blood, differ much among themselves, as they have been habitually supplied with more or less nourishment during their periods of growth. As a rule, the smaller the sheep the finer and shorter the wool. The rams are sold at prices varying from \$20 to \$300; the ewes from \$10 to \$200. The stock from which some of the best flocks are descended date the departure of their ancestry from Spain in 1755, and their foundation by the present proprietors from 1830 to 1843.

The *Merino de Naz* is a small sheep with an exceedingly fine fleece, possessing softness, elasticity, strength and the best felting properties. The weight and dimensions of carcass and fleece of a pair seen at the Garden of Acclimation, near Paris, are as follows:

Ram 2 years old: Length, 3 feet 3 inches; height, 2 feet 3 inches;

The wools shown (1851) by Messrs. Isaac Figdor & Sons, of Vienna, Austria, received the Council Medal, (equivalent to a Grand Prize) as the best German wools, and hence the best in the entire Exhibition—possessing the “desired qualities of substance in the staple and firmness and elasticity of the component fibres, the spiral curves of which are close and regular, and are immediately resumed after being obliterated by stretching the fibre, the length of which is also considerable for wool of this ‘carding’ quality, the most valuable for the finest descriptions of cloth.”

girth, 3 feet 3 inches; weight of carcass, 110 pounds, of fleece 9½ pounds in the dirt. Ewe 4 years old: Length, 3 feet; height, 1 foot 11 inches; girth, 2 feet 11 inches; weight of carcass, 72 pounds; weight of fleece, 5 pounds in the dirt.

The flock was founded by the family of the present owner, M. le Général Baron Girod, at Naz, in France, from selections out of the merinos brought into France from Spain in 1799, and is claimed to have been bred in-and-in, to the present time, without the introduction of any other blood whatever. The wool has received first class medals at competitive exhibitions in Paris, in 1823, '27, '34, '39, '44, '55, '60 and '67—in London, in 1851 and '62. They are said to be hardy and to flourish even on humid or marshy lands, and on the scanty pasturage afforded by the sides and summits of the Jura mountains; that on better pastures the weight of fleece may be considerably increased without sensibly affecting the fineness of the fibre or its value in any respect for use in the manufacture of the finest cloths.

Unquestionably, this flock has received the greatest care, and has attained to that uniformity and stability of characteristics necessary to assure the transmission of their qualities in a marked degree, when individuals are used among other varieties of the merino family as breeders. Most American shepherds, however, object to breeding so closely as this flock has been bred, and would apprehend a serious want of constitutional vigor. They secrete less gum and yolk than the *Negretti*, and hence their fleeces lose a much less per cent. in washing.

The *Mauchamp*, taking their name from the place of their origin in France, Department of Aisne, sprang from a cross of the French merino on the Kentish or old Lincolnshire of England. One of this produce, seemingly a *sport*, showed a fleece with little resemblance to that of either parent. It had neither the crimp nor elasticity of the merino, scarcely any undulation at all in the fibre; nor the coarse long fibre of the other; but was found to exceed the merino an inch or two in length, as well as somewhat in fineness, and to have a silky softness, a lustre of great beauty, together with much strength. From this animal, by judicious selections and careful breeding, Jean Louis Graux, of Mauchamp, established a flock for which he received the only Council Medal awarded to a sheep breeder at the London International Exhibition of 1851, and in awarding which the jury state it to have been

awarded for "the origination of a new and valuable quality of wool, giving to the variety of merino the best quality for combing, and possessing increased strength, brilliancy and fineness of fibre."

As bred by Mr. Graux, the *Mauchamp* is not above middle size notwithstanding its descent. A ram 4 years old, at the Garden of Acclimation, measured 2 feet 11 inches in length; height at the shoulder, 2 feet 4 inches; girth, 3 feet 7 inches; entire weight, 130 pounds; weight of last fleece, 12 pounds in the dirt. A ewe 3 years old, measured in length 3 feet; height at shoulder 1 foot 11 $\frac{3}{4}$ inches; girth, 2 feet 11 inches; entire weight, 75 pounds; weight of last fleece, 6 pounds in the dirt; the shrinkage by washing in cold water could not exceed 25 per cent., as there is little grease, gum or yolk in the wool.

Mr. Graux' management of the flock, keeping them on rather short allowance, does not favor the early maturity or increased proportions of the sheep; but experiments with selections made from his flock for the Imperial flock of Gevrolles, (Department of Côte d'Or) have demonstrated, as asserted by undoubted authority, that, transferred to more abundant and nutritive pastures, the same sheep may be bred up to a development of carcass approaching their long-wooled English ancestry, producing heavier fleeces, still retaining their peculiar features of lustre, brilliancy, fineness and strength of fibre. They have been christened "indigenous Cashmeres."

At the Imperial sheep farm referred to, the experiment has also been made of crossing the *Mauchamp* on the *Rambouillet merino*, and with the happiest results. A wool is produced of more lustre and greater length and fineness than the pure *Rambouillet*, and of more elasticity than the *Mauchamp*. The cross, not being a *violent* one, owing to the relationship of the races, its effects are not harsh.

And here I confess to a strong conviction that, from the best information I could obtain, and the opportunity was favorable, the *Mauchamp*, being in its origin a sort of connecting link between the long combing-wool varieties and the descendants of the merinos of Spain, offers a most promising medium for the amelioration of the merinos and their crosses in the United States—a medium of converting the latter from being the producers of a variety of wool of which there is now more in proportion to the de-

mand for manufacture than of any other, into the producers of a variety for which there is great demand and almost no source of supply among our home flocks. Of the 20,000,000 pounds of combing wools of all grades demanded by our manufacturers we produce a scant million. If, too, I am not mistaken—or rather, if the same results as obtained by the cross of the *Rambouillet* and *Mauchamp* in France shall attend the experiment of coupling the *Mauchamp* with the merinos here—a few years at most, by judicious breeding, would give us the most valuable combing-wool in the world, and in any desirable quantity.

The parentage of the *Mauchamp* speaks for itself on the question of native vigor of constitution; you have seen samples of the wool and observed that it is entirely exceptional in its character for brilliancy of lustre and fineness—regarded as a combing-wool; I have stated the reputed origin of the race, and well authenticated facts in relation to the improvement for combing purposes obtained in the merinos of France by crossing with the variety under consideration; no one is ignorant of the fact that if a large proportion of the American merinos could be at once changed to producers of good combing wool, a much enhanced price would be realized for both home-grown carding and combing wool; you are all familiar with the fact that, other things being equal, the most lustrous and finest combing wool is worth most in market; and I therefore venture to suggest that if some enterprising wool grower, or better, perhaps, if the Illinois State Wool Growers' Association will appropriate a few hundred dollars to the purchase and importation of male animals (chiefly) of this breed, they may find in this Frenchman a veritable Moses to both the almost despairing fraternity of merino growers and the equally embarrassed brotherhood of lustre-goods manufacturers in the United States.

I have great confidence in the success of such an experiment, and see no other inviting way open to rescue thousands of the most perfect and well formed heavy fleeced merino ewes from the butcher's knife—no other means of using our already accumulated stock in the production of the best and most valuable combing wool in the world.

All the long-wooled varieties will, in any event, take care of themselves; their fleeces will always be in demand, and there is not the slightest danger of over-production; but as *lustre*, more

than any other quality, determines the relative value of even long-wools, it is not impossible that a cross or two of the *Mauchamp* on the Cotswolds, Leicesters, and others of the same class, may add many cents per pound to the value of the best long wool grown here. Of itself, the *Mauchamp* is not so desirable with us; because, as is the case with the Cashmere-goat hair or wool, its purpose is entirely special, and we have not yet much machinery adapted to its manufacture. However, while the demand for all grades of combing wools increases more rapidly than the supply, the tendency of our manufacturing industry is constantly to run on firmer and more lustrous fabrics, requiring a fibre more nearly every year approaching that of the *Mauchamp*; and if the production of the raw material could but keep pace with the demand, the progress would be still more rapid, and the amount of manufacture proportionally increased.

A glance at the sheep husbandry of the United States to-day, reveals the fact that the great mass of those devoted to growing wool are stocked with Merinos and their short-wool grades, and that enough are so engaged and competing in the market for the sale of this class of wool, as to comparatively supply the demand; so that manufacturers, by the aid of importations of a low-priced, inferior wool from South America, have heretofore, with exceptional years, managed to fix the price of each succeeding clip, and, in the last two years, have purchased it at rates almost ruinous to the farmer.

On the other hand, a small number are engaged in growing longer and coarser-wooled varieties; and, with the ever-increasing demand, fail to furnish one-fifth of an adequate supply. Nor is it practicable for American manufacturers to obtain an *adequate* supply elsewhere. The consumption in Europe requires all that is there produced, so that Canada regularly reaps the chief part of the rich harvests which should be gathered by the wool growers of the States.

How is this condition of things to be best and quickest changed? How is the production of combing-wool in the United States to be most rapidly augmented?

Clearly, it must be the work of generations to breed the long-wooled sheep up to the number required, if, with the increased consumption of the fabrics, it is practicable at all. The annual numerical increase of the flocks is not more than 35 per cent. on

the whole number of sheep, which is not greater than the annual increase of the long-wool demand.

I have, for these and other reasons, therefore, no expectation that any sensible measure of relief will be afforded, unless it be through the use of a considerable proportion of the Merinos themselves as the *basis* of a change. I do not believe it possible to make progress relatively with the demand in any other manner.

It will effect nothing to say "the western prairies are covered with the most nutritious grasses, and supplied with abundant cheap food, therefore *raise the large-carcassed, long-wooled sheep.*" Where, pray, is the breeding stock to come from? Our flockmasters have more sheep now than it is profitable either to kill or to keep. They cannot buy others, unless they can sell or exchange what they already have; neither of which is practicable. Crossing Cotswold or Leicester rams on Merino ewes, would be attended with much hazard, as every shepherd understands, while the mixed fleece would, in almost every instance, be uneven and otherwise defective. The experiment has been often tried, but rarely with satisfactory results, and never, unless in the origin of the *Mauchamp* variety, except after many years of careful breeding, has a distinct race, with fixed characteristics, been established.

With the close blood relationship of the *Mauchamp* and *Merino*, with the demonstrated effects of the second cross at *Gevrolles*, and with the unsurpassable lustrous fibre of the *Mauchamp* all in view, the elements of success and the best financial results seem within the reach of the western flockmaster who will promptly strike out in this direction.

The *Rambouillet* flock I had the opportunity of seeing at the Imperial Farm of that name, which I visited on the 13th of July, 1867, at the invitation of Mr. Tisserand, who for some ten years past has had the supervision and general management of the agricultural domains of the Crown, and to whose courtesy I am much indebted for a large share of the pleasure enjoyed, and information obtained, during my stay in France.

The estate of Rambouillet, consisting of many thousand acres, (some 35,000, I believe) lying some 32 miles south-west of Paris, on the railway to Chartres, is devoted by the present Emperor to purposes of the chase and to the maintenance of the celebrated

flock of sheep.* The farm proper comprises about 2,500 acres; of which some 750 are under cultivation. The present flock consists of about 1,000 sheep, some 400 of them being breeding ewes. So much of the crop as may be required to maintain this number of sheep well, is harvested, and the residue is consumed by the game of all choice varieties of bird and beast yet acclimated in France.

The sheep-folds and all structures for the accommodation of the sheep are, of course, well arranged, roomy, well ventilated, and complete in appointment. I noticed a small wooden roller set into each jamb of every door through which the animals had occasion to pass, and which seemed to serve an admirable purpose in preventing injury from bruising the bodies or starting the wool, as they pressed through—it was about $3\frac{1}{2}$ feet long, 4 inches in diameter, and shouldered in.

When the flock was founded in 1786, by the present of a number of choice animals from the King of Spain to Louis XIV., portraits in oil of the rams and ewes were taken and are still preserved, to show by comparison, the improvement effected. Up to 1860, no introduction of other animals than those bred from the originals had been permitted. I have an impression, which however may be erroneous, that about that year the services of one or more superior animals, bred elsewhere, were called into requisition. Whether this be so or not, there did not seem to be quite the uniformity which one would naturally expect to see where, with a limited number of animals, under the same conditions, in-and-in-breeding had been strictly pursued for eighty-one years. In general they possess great size, and a remarkably robust fullness of muscular development rarely found among merinos; the wool, though not *very* fine, is long, sound, stylish, with an even crimp, and much elasticity and strength of staple. Nearly

*The Director of this Imperial sheep-walk is M. le Baron Daurier, son of an officer of the same name, who served under General LaFayette in the American Revolution, and at the close became an officer in the Revolutionary Order of the Cincinnati. On the decease of the father, by the recommendation of General LaFayette, the present Baron Daurier succeeded, by special decree, to the degrees of his father in the Order. Learning that I was an American, the old gentleman seemed to take pleasure in manifesting the pride he might justly feel in the patriotic career of his father, and permitted me to examine the correspondence and diplomas relating to his connection with this illustrious Order. He is hale, hearty and well preserved, at about 70 years of age, and led the party, consisting of Mr. T., Mr. Aureliano of Bucharest, and myself, with apparent ease in a ramble over the estate of several hours. We were received by the Director and his good lady, and entertained in the most hospitable manner.

all the males not selected for breeding to the same flock, are readily sold at from \$20 to \$500, and find their way to all parts of the world. Of late Australians have been large purchasers. Three splendid rams were shown me which had just been sold to go to Australia, at \$400 each; and one at \$30.

That crossing good specimens of the pure *Rambouillet* sheep upon the mixed merinos and grades of this country, would be followed by some improvement in length of fibre, and possibly in many cases, give a length suitable for combing as *de laine*, may be readily supposed; but all things considered, the *Mauchamp* cross would probably result far better.

New England woolen manufacturers, as I have the best authority for saying, have no difficulty in discovering in the spirit and enterprise manifested throughout the Northwest, by the erection of woolen mills for the manufacture of the medium and coarser fabrics, that this extensive district, where all the necessary elements are found clustered together, is soon to become the producer of its own goods of this class; that the star of empire is already casting its rays over this land of plenty. They are inclined to accept the situation kindly, and, by favor of their already skilled labor, large capital and rich experience, to assume towards the West the position which England and France have heretofore held towards the whole United States—turning their looms and spindles to the production of fine cloths and other tissues of expensive luxury.

Thus will arise a still greater demand for the fine, lustrous combing, as well as for the fine, short-staple carding wools.*

In view of this approaching condition of the woolen industry, it may be that in mild climates, and such other favoring circumstances as are presented towards the southern extremity of the Apalachian chain of mountains, or almost anywhere in the United States, south of 36° north latitude, the pure *Negretti* or *Merino de Naz* bred to the finest, short-stapled, heavy-fleeced Spanish or American merinos, would prove an entire success in all respects; there is, indeed, little doubt of it, if prudently conducted; and from some such enterprise, persistently carried out, it seems to me, must come the home supply of fine short-staple, suited to the advanced standard of New England manufacture—

*In Europe wools are sometimes combed which are but 1½ to 2 inches in length; the American factories, however, divide the two classes on 3 to 3½ inches.

taking for the *basis*, as in the case of the improved combing-wools, the best selections from the varieties of sheep now on the fields of the North and West.

I have not cared to call attention to, or to describe at all, the other races of sheep and classes of wool which were shown at the Exposition. Those referred to are typical of their respective classes, and with all the long-wools of the British Isles, American shepherds are already well acquainted.

It may however, be well to state the varieties of sheep in connection with the classes of goods to the manufacture of which their fleeces are in general best adapted, to-wit:

For *Lustre Goods*, pure and mixed—such as poplins, mohairs, grenadines, alpacas, etc., the *Mauchamp*, *New Lincolnshire*, *Romney Marsh*, and some families of the *Leicestershire*.

For *Worsteds*: the very longest stapled *American*, *French* and *Rambouillet merinos*, the *Leicesters*, *Cotswolds*, *Romney Marsh*, and all long woolled breeds.

For *Rich Carpets*: the *Mauchamp* and *Camaranian* wool, *Angora goat's* hair, with mixtures of less costly and shorter fibres.

For *Cloths* of medium fineness and finish, *Tweeds*, etc.: *American* and *French merinos*, and all other varieties of sheep, producing the middle* grades of short staple.

For *Fine Broadcloths*: *Negretti*, *Merino de Naz*, some families of the *Saxony* and other European races producing a staple of superior felting properties and sufficient fineness.

As South America is the great competing producer of fine wools with North America, it may not be uninteresting to look at the figures in regard to the increase, price of the sheep, wool-product, and sale of wool on a noted sheep farm of that country. The following is a copy of a circular intended for those persons designing to engage in sheep-husbandry in that region: (The samples of wool were on exhibition, and a portion of many of them were presented me in exchange, and are among the collection in the Society's Rooms.)

*Not used technically, as understood by manufacturers, who in England classify wool with the nicest distinction into almost innumerable grades. Some American mills sort into *super-super*, *super*, *extra*, *prime*, 1st, 2d, 3d, 4th and 5th; nearly half of the whole consumed being from *prime* to 2d inclusive which are the *middle grades*.

SOUTH AMERICAN WOOL CLIP OF 1866,
Grown at the *Estancia de Los Altos, Perdido, Republic of Uruguay.*

SAMPLE NO.	FLOCKS.	CLASSIFICATION.	SIRE IN FLOCKS.	SELLING PRICES.			
				M. Videan	Nat. Dollars,	ex. 52 pence.	
				<i>Ewes, picked.</i>	<i>Ewes, by cut.</i>	<i>Rams, stall fed</i>	<i>Rams, camp fed.</i>
<i>Nine Ram-Breeding Flocks.</i>							
No. 1	1 flock	Best Negretti,	Negretti,	\$40	—	\$76 upwards.	—
" 2	1 "	Second "	"	15	—	—	\$15
" 3	1 "	Third "	"	12	—	—	12
" 4	1 "	Pure Rambouillet,	Imperial Rambouillet,	40	—	76 upwards.	—
" 5	1 "	Negretti x Rambouillet x Negretti	Pure Rambouillet,	20	—	—	30
" 6 and 7	2 "	Negretti x Rambouillet,	Negretti,	10	—	—	12
" 8 and 9	2 "	Merino x Rambouillet x Negretti,	Negretti x Rambouillet,	8	\$6	—	8
<i>General.</i>							
" 10 to 19	10 "	Best general flocks,	Negretti x Rambouillet,	—	3	—	5
" 20 to 28	9 "	Next best,	Mestiza x Rambouillet,	—	1.40	—	—
" 29	1 "	Leicester cross,	Fine Rams,	—	or 1.60 with option of rejecting old and infirm ewes.	—	—
" 30 to 31	2 "	Wethers,	—	—	—	—	—
31 flocks, giving 5½ lbs average weight of fleece; the highest average of ewe fleeces being 7 to 9 lbs., lowest about 4 lbs.; ram fleeces up to 20lbs., all growth of one year.							
Weight of ewes, alive, up to.....190 lbs.							
Weight of rams, alive, up to.....220 lbs.							
3 fleeces from Negretti flocks.							
3 fleeces from Rambouillet flocks.							
1 fleece from Merino x Negretti x Rambouillet flocks.							
Fleece spls							
No. 1, 2, 3							
4							
8							

This Entancia consists of 40,000 English acres of fine grazing land, and for the last 12 years has proved one of the most flourishing sheep farms on the River Plate.

On the 31st December, 1866, the total count of sheep was.....	52,585
The sales since the commencement have been... ..	62,502

Making a total of.....	115,087
Deduct original stock placed there in 1854.....	7,868

Shows an increase since that period of.....	<u>107,219</u>
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The quantity of wool received since the commencement has been 1,038,854 lbs., partly washed and partly unwashed. The clip of 1866 was 8,300 arrobas of 25 lbs. each, unwashed, and was delivered for an American manufacturer at $5\frac{1}{2}$ patacones p arroba, equal to $10\frac{1}{2}$ d. p lb., free on board, including locks and bellies.

ANGORA GOAT'S WOOL. The publications by Hon. I. S. Diehl, in the Reports of the Department of Agriculture and Agricultural papers of the United States, have placed the public in possession of all the material facts in regard to the importation, propagation, and value of this Goat as a producer of wool. Mr. D. was at the Exposition pursuing his researches with characteristic enthusiasm and industry, and has since made another importation of a flock of the goats. I learned nothing in relation to them or the uses of their beautiful fleeces, with which you are not already familiar.

If, however, the preceding suggestion of crossing *Merino* ewes with *Mauchamp* rams should be acted upon, and the experiment result, as I trust it will, successfully, we may have in this country at the end of a few years, so large a quantity of exceedingly lustrous, fine wool, that the slow and expensive process of importing and breeding entire flocks of Cashmere or Angora goats or other single race for combing-wool, will seem undesirable.

TOBACCO.—Another cosmopolite, surely, of which, in its multitude of unaccountably seductive forms, there was a large exhibition. “Vice has long legs, and virtue must needs run fast to overtake it.” It has so happened that whenever this “narcotic, emetic and cathartic” plant (*Nicotiana tabacum*) has been introduced to man, savage and civilized alike have given it a reception due only to a more worthy stranger, and have cherished it with an affection and cultivated it with an assiduity, rarely accorded even to better things. It took the Potato, for example, from its introduction into Alsace on the Rhine, in 1596, more than two hundred years to find its way to public and general favor in that province, although destined to become the food

basis of the population; whilst tobacco, which began to be cultivated there in 1620, was produced as an article of commerce at the close of the seventeenth century, or in about eighty years, to the amount of 5,000,000 lbs.! and from 1718 reached about 8,000,000 lbs.; employing in Strasburg alone, 8,000 workmen in seventy-two factories.* I was under the impression that the United States was entitled to the "bad pre-eminence" of using more tobacco in proportion to population than any other country, until in the room of the South Kensington Museum (London) at the Exposition, a table, of which the following is the substance, met my eye:

Relative annual consumption of Tobacco in the following countries in ounces per head of the *male* population:

1st Zollverein, embracing all the German States except Austria....	155	8th France	89 $\frac{1}{2}$
2d Belgium.....	143	9th Spain	76 $\frac{1}{8}$
3d Holland.....	131	10th Sweden.....	69 $\frac{3}{4}$
4th Denmark.....	128	11th Great Britain.....	65 $\frac{1}{2}$
5th United States.....	120	12th Portugal.....	56
6th Austria.....	107	13th Sardinia.....	45
7th Norway.....	101 $\frac{1}{4}$	14th Tuscany.....	40
		15th Papal States.....	32

The relative annual consumption of Tea, stated in ounces per head of the *whole* population, is as follows:

1st Great Britain.....	35	4th France	1
2d United States.....	15 $\frac{7}{8}$	5th Zollverien.....	$\frac{5}{8}$
3d Russia.....	4		

The relative annual consumption of Sugar stated in ounces per head of the *whole* population, is as follows:....

1st United States.....	40	4th France	4
2d Great Britain.....	30	5th Austria.....	1 $\frac{1}{2}$
3d Belgium.....	6	6th Russia.....	1 $\frac{3}{8}$

First in Sugar, second in Tea, and fifth in Tobacco, is not so bad as it might be.

The highest award reached by the United States on Tobacco was a Silver Medal, for Snuff exhibited by a New Orleans firm. Few foreigners are competent judges of chewing tobacco—the use of it in that form being chiefly confined in Europe to *Americans* and *sailors*—and it is not unlikely that our exhibition was not properly appreciated. The West Indies, Central and South America, as was to be expected, were large and successful exhibitors—mainly of cigars, cigarettes and the leaves. The superiority of their products of this class is universally acknowledged, and is owing, doubtless, not to any merit in their processes of cultivation, curing or manufacture, so much as to the effect of their peculiar climate and soil on the qualities of the plant itself.

*M. Tisserand—Enquête agricole, 13th Cir.

SIXTH GROUP.—The man who could have taken position any where on the elevated platform of that great Machinery Nave, and looked down along its gracefully curving line, listening to the busy hum of its numberless machines, whose cunning was consecrated to the “Common Arts”—the arts by which countless millions of mankind in all enlightened countries live and thrive—without feeling his hope and faith in universal progress renewed and confirmed, must have been of those who “having eyes see not and having ears hear not.” It is here humanity has the largest interest—here where the triumph of mind over matter, in grasping natural elements and forces and subjecting them to purposes of man’s daily life, is most clearly manifest. No nation is great which is not great in this.

The steam power demanded by the exhibitors of each nation requiring it, was distributed as follows: France, 305 horse-power; England, 100 do.; United States, 50 do.; Belgium, 40 do.; North German Confederation, 35 do.; Austria, 20 do.; Switzerland, 17 do.; South German States, 15 do.; total 582 horse-power. The power demanded by the hydraulic and ventilation services of the Exposition was about as much more. Those furnishing their own motive force were France, England, Belgium and the North German Confederation; the others were supplied by French artisans; and it touched the pride of more than one American visitor to observe the beautiful Corliss Engine, represented on the opposite page, and to which was awarded a Gold Medal, standing idle throughout the Exposition, by the side of a French engine which furnished the power for American machinery—in seeming acknowledgment of inferiority.*

In addition to the 1,229 feet of double line of shafting moved by steam-power, isolated gas-motors were placed wherever required, and served to propel many light machines. Between the sections of this gallery, thus furnished with motive power, were constantly performed under the eye of the visitor, the thousand little operations of manual industry which belong to the household or the small shop of the modest artisan. The nimble-fingered

*It is due to the Corliss Steam Engine Company of Providence, Rhode Island, who manifested the enterprise and incurred the large outlay necessary to make this exhibit, to say that, up to a late hour they *expected* to use this engine in the American section, and it is also due to the U. S. Commissioner General to say that he claims to have yielded only to a necessity in employing the services of another, not having been definitely assured, in time, that the Corliss Engine would be sent.

CORLISS ENGINE.
GOLD MEDAL AWARDED
PARIS EXHIBITION, 1867.

lace-makers with their cushions and pins and bobbins, the glass-blowers, the makers of glass flowers, beads, etc., the hatters, hair-workers, comb-makers, shoe-makers, manufacturers of pocket-books, cork-cutters, confectioners, printers and hundreds of others were plying their curious trades and selling their "Souvenirs of the Exposition" from day to day.

Among the first things in this group which attracted my attention, were the inscriptions which our British friends, whose real merit will always be received as ample apology for considerable ostentation and even occasional blunders, had emblazoned on the immense windows of their section of this Gallery, and most of which I copied, as follows—each occupying one window, and sometimes referring to a drawing by its side:

"*First Carding Engine*, made and worked by Richard Arkwright in MDCCLXIX."

"*First Spinning Machine* made and worked by Richard Arkwright in MDCCLXIX."

"*Watt's first Sun-and-Planet Engine*, in 1788, by which rectilineal was converted into rotary motion for the purpose of driving machinery."

"*Bell-rock Light House* lighted in 1811. Robert Stevenson, Engineer. (Commissioners of Northern Light Houses, Scotland.)"

"*Remains of the first Steam Engine* to which the separate condenser and air-pump invented by James Watt were applied in 1777."

"*Telegraphy*—An apparatus for transmitting signals by galvanic electricity, invented by Cook and Wheatstone in 1837."

"*Telegraphy*—An instrument for transmitting through 8 miles of wire, signals by tension electricity; invented by Mr F. Ronalds, formerly of Hammersmith, in 1816."

"*Gas*—Gas-meter or gauge invented by Samuel Clegg, in 1815, and first used in the Peter St. Gas works at Westminster."

"*Locomotives*—The Rocket, made by George Stephenson in 1829—gained the prize of £500 in the Liverpool and Manchester competition."

"*Locomotives*—The Sanspareil, made by Timothy Hackworth—ran in the competition on the Liverpool and Manchester Railway in 1829.

"*Locomotives*—The Novelty, made by Messrs. Braithwaite and Ericsson—ran in the competition on the Liverpool and Manchester Railway in 1829."

"*Locomotives*—Puffing Billy, made by William Hedley in 1813 to work the Wylam Collieries—the first locomotive engine with smooth wheels."

"*Steam Navigation*—William Symington's paddle-wheel engine propelled a small double boat in Scotland in 1788. This was the first successful practical experiment in steam navigation."

"*Steam Navigation*—Henry Bell's steamboat, the Comet, first navigated the Clyde in 1812 for passengers and goods and introduced steam navigation into Europe."

"*Stockton and Darlington Railway* incorporated in 1821. This, the first Locomotive used on a public railway, was built by George Stephenson in 1825, and continued to run over the Stockton and Darlington Railway till 1846."

"*Penny Postage* invented by Rowland Hill, K. C. B. Number of letters in 1839, 82,470,596—in 1866, 597,277,616."

"*Navigation*—A Magnetic Needle was first used in a compass in 1300, by Flavio Gioja di Amalfi. The number of Steamships belonging to Great Britain is 2,523, registering 766,200 tons."

"*Sedan Chairs* first introduced into England in 1581; they came into fashion in London in 1634, when Sir Francis Duncombe obtained the sole privilege to use, let and hire them, and they came into general use in 1649."

"*Hackney Coaches* were first set up in London by Capt. Bailey in 1625."

I shall not attempt to describe, much less to speak critically of, the display in this group—it was simply magnificent, marvelous, grand.

Almost every nation was compelled to provide space outside the Palace for the exhibition of portions of its implements and machinery properly belonging here; and unfortunately for the *appearance* of the United States' section, nearly all our *nationally characteristic, world-renowned* contributions were unwisely placed in a shed, where not one visitor in a hundred saw them at all, and where, of course, they added little to the eclat of our exhibition. Thus, the Locomotive sent by the Grant Locomotive Works, of Paterson, New Jersey, one of the most elegant specimens of fine work and high finish at the Exposition; a street railway car; all our sewing and knitting machines, of which there was a large exhibition; our agricultural implements, reapers, mowers, plows, etc.; carriage and wagon work; pumps; a very large exhibition of scales by the Howe Scale Company and Fairbanks, were not to found in the Palace at all; in short, more gold medals were awarded to objects belonging to this group placed in this annex, than to those that were permitted to remain in the Palace! Most American visitors were not so charitable as to attribute such manifest and damaging mistake to the want of intelligence merely, on the part of the United States Commissioner General; and I can find no terms suitable to express the righteous indignation of nearly every American exhibitor towards Mr. Beckwith for his unblushing persistence, against repeated and respectful protest, in this and other even more serious errors.

AGRICULTURAL IMPLEMENTS AND MACHINERY.

It will be observed that Class 48 of the 6th. Group, embraces in part, the same objects relating to rural work, as are included in Class 74 of the 8th. Group. Having received an appointment

from the Imperial Commission to act as an associate member of the International Jury for Class 74 of the 8th Group, and having performed that duty from day to day and week to week, from the first of May until my departure in August, it will be better, perhaps, to speak of these objects in connection with my report on this Group. The original members of the Jury with whom I was thus brought in contact, were gentlemen either eminent for their technical and scientific learning, or large proprietors possessing much practical knowledge of the methods and processes of European agriculture. It happened that several of them spoke the English language well, though all were natives of the continent of Europe. The courtesy uniformly extended to me, relieved the position from any embarrassment, and rendered the performance of its duties most agreeable.

In addition to this opportunity of observing the agricultural practices and tools regularly exhibited in competition in the Palace and at Billancourt, I visited Mèlun, as already stated; the Imperial Farms at Lamotte-Beauvron, about 120 miles southwest of Paris; at Rambouillet; at Camp de Châlons, some 120 miles east in the Champaign district; and the model farm at Vincennes, adjoining Paris—all but the first in company with Mr. Tisserand, who directs the operations and culture of each with great ability.

In speaking of agricultural implements and machinery, inasmuch as they are connected with a branch of industry of the first importance in the world and common to every part of it, the views expressed will necessarily be to some extent comparative; it will therefore be well to bear in mind a few facts which lie at the foundation of Agriculture in Europe, and especially a few essential particulars in which the conditions controlling the pursuit of rural husbandry there differ from those present here in Illinois, and which were constantly forced upon my attention. Among these are:

1st. In nearly all Europe, the tillable surface is exhausted of its primitive natural fertility—so much so, that without systematic and copious applications of fertilizers, it would respond with annual crops but a very few years at most.

2d. Owing to the fact that only the inorganic or mineral *basis* of a soil is left, the elements of which vary with almost every geological formation upon which it rests, and of which it is substantially composed, *special cultures* are the rule and mixed hus-

bandry the exception. These cultures are still further confirmed and encouraged in many districts, by the general prevalence of household industries, drawing their supplies of raw materials from the products of tillage.

3d. Population is very dense, and hence, manual labor is cheap; while real estate, staple farm products, and the labor of all animals whose carcasses are not generally used for human food, are dear.

4th. In no generous sense, can the laboring people of the rural districts, in any part of the old world be called educated. Taught to regard themselves as "hewers of wood and drawers of water," for higher or more wealthy classes, and without what we call general intelligence, they are wedded to old ways, and manifest little elasticity of mind or aptitude to invent, or practice or appreciate new and better methods.*

5th. Almost all important efforts and experiments, the result of which has been to improve agricultural practice and increase production, have originated with the governments, or in special schools maintained in whole or in part by governmental patronage, as necessary measures of political economy.

We are all aware that precisely the opposite of each one of the foregoing propositions is true to-day in Illinois; and every reflecting mind will readily comprehend how, in one way and another, in processes, tools and methods of culture, farm husbandry must be modified by considerations of such fundamental importance.

Seventy-four acres on the Island of Billancourt, some three miles down the Seine from the city, had been designated as the

*Only the laboring population strictly—those who till the soil with their own hands—are intended to be referred to in this proposition. No class of men probably anywhere, are more keenly solicitous for the adoption of all real improvements, or seize upon and adopt them in practice so far as possible, come from where they may, than intelligent proprietors in France. At the close of the International Exposition of 1855, the official reporter, after acknowledging in no measured terms, the superior construction of plows and some other farm implements of English manufacture, and his unbounded admiration for the American Mowing and Reaping Machines, urges in behalf of the Jury, the reduction of the tariff on manufactures of this class, and at least on those taking prizes. I translate a paragraph or two: "Let foreign agricultural machines and implements of culture enter France by means of moderate tariffs and they will extend themselves throughout all rural operations; the most humble blacksmith of the villages will know how to imitate good models, to simplify the too costly parts, and progress will cease to be stopped at the frontier. This is an international question and not merely a French question. Foreign manufacturers ask only an increase of the market on which to throw their implements; farmers are convinced of the immense advantage there is in the adoption of certain mechanical inventions made abroad, and regret that financial obstacles present themselves so that these inventions cannot penetrate in every place where a grain of wheat can sprout."

This may be accepted to-day as the expression of enlightened public opinion on the continent of Europe, if not in the British Isles.

place for holding the trial of all agricultural implements, except those for harvesting grass and cereals, which last it was early known would be tested on the Imperial farm of Fouilleuse, some six miles south-west, near St. Cloud.

The order assigned for the entire exhibition at this Island was as follows:

- APRIL. *First fortnight.* Plows of all kinds—hydraulic machines—steam machines.
Second fortnight. Steam plows—harrows, rollers, weeders, scarifiers,—devices for working up clays, etc., machines for making drain tile.
- MAY. *First fortnight.* Seeders and distributors of manures—flax and hemp dressing machines—vehicles, harness—scales—churns and dairy utensils.
Second fortnight. Mowers, hay-tedders, rakes and other hay-making implements for use in gathering, pressing and preserving hay.
- JUNE. *First fortnight.* Farriery. Examination of rural establishments.
Second fortnight. Straw-cutters, root-cutters—horse-hoes, hilling implements—mills.
- JULY. *First fortnight.* Apparatus for shearing different domestic animals.
Second fortnight. Reapers and implements for harvesting cereals.
- AUGUST. *First fortnight.* Threshing and other machines designed for cleaning and preserving seeds.
Second fortnight. Farm furnaces, apparatus for cooking legumes, for washing, for the manufacture of manures.
- SEPTEMBER AND OCTOBER. Examination of specimens of divers Agricultural industries.

The exhibition of Animals at Billancourt took place in the following order:

- APRIL. *First fortnight.* Breeding-sheep for mutton.
Second fortnight. Fat animals.
- MAY. *First fortnight.* Breeding-cattle for the dairy.
Second fortnight. Breeding-sheep for wool.
- JUNE. *First fortnight.* Draft-horses.
Second fortnight. Poultry.
- JULY. *First fortnight.* Work-cattle (breeders).
Second fortnight. Horses for pleasure—for saddle, for hunting, for carriage, ponies, etc.
- AUGUST. *First fortnight.* Dogs.
Second fortnight. Work cattle. (They should be sent in pairs, and trained to yoke or collar. Special trials will take place to test their aptitude for work.)
- SEPT. *First fortnight.* Breeding-swine.
Second fortnight. Asses, mules, crosses of the horse and ass.
- OCT. *First fortnight.* Neat cattle for beef. (Fat animals and breeders).
Second fortnight. Divers acclimated animals and such as are susceptible of being.

PLOWS.—Not being connected with the Jury until the first of May, the trials of the Plows had taken place while my attention was engrossed by events transpiring at Champ de Mars, and I did not see the operation of these implements, but only the

ground as they left it at the close of the trials, and the plows at rest. It would require a discussion of mathematical laws in their application to the construction of this important implement, for which I am illy prepared, and illustrative diagrams for which there is no provision, to report in detail intelligibly and to consider fully the comparative merits of the plows exhibited. I must therefore speak in general terms, as my promise is to tell you how things seemed to me, rather than absolutely how or what they were.

No American plows* were tried; the prizes they received having been awarded to them without removal from the Annex.

The English seem to have attained perfection in the construction of a plow which realizes their ideas of perfect work—to turn a furrow slice, at whatever depth, so evenly and gradually as scarcely to disturb its component particles of earth in their relations to each other. The inversion may be more or less complete, but the line of furrow must be entirely straight, and the furrow-slice unbroken. With them this implement is in no sense a pulveriser to any extent; after-labors with other tools must prepare the seed-bed for the reception of the grain and the extension of the supporting roots. The function of the plow is fulfilled in their view when the soil to be tilled is severed from its bed and wholly or partially inverted, so that the blades and teeth of lighter implements, aided by the crusher and roller, can pulverise its parts and evenly incorporate the applied manures.

To attain the proposed ends, the English manufacturers and inventors have fully decided in favor of a plow with a mould-board of great length and curved with mathematical precision; the beam and handles also very long; with an entire weight much greater than any of the same class manufactured here. For beautiful regularity and accuracy, I have never seen the plowing done by English plowmen at Billancourt equaled, rarely indeed approached; and yet, the fact that no pulverization whatever is accomplished, necessitates an amount of subsequent work in harrowing and rolling, which must, even in countries where labor is cheap, render the proper preparation of the soil exceedingly expensive, and in this State, where the summer springs upon the

*The only one in my charge was from Messrs. John Deere & Co., of Moline, which was sold to the Prussian Minister of Agriculture for \$30 in gold—an A. No. 1, Clipper, without a coulter—and therefore not in condition to work on the ground selected for trial, which was green-sward.

farmer from the lap of winter, the seed would too often be thrown upon ground in bad condition to receive it.

It is a practical, historical fact, I believe, that all plows brought to this State from Great Britain, (and there have been many), from the time of Mr. Birkbeck, about 1830, to a recent period, by those whose convictions amounted to strong prejudices against the American and in favor of the imported, and who had handled the latter in Britain for years, have failed to give satisfaction, and have invariably been discarded for those of our own first-rate makers. Generally they have not *scoured*, and have always been condemned as unwieldy, heavy-draft "horse-killers"—doing little execution in proportion to the strength of team required to draw them.

From whatever considerations, it so happened that no British made plow received a prize at this International trial, although one of them was admitted to be held by the best plowman in England, and certainly performed its work to the entire satisfaction of its manufacturer.

The English official reporter's criticism on American plows at the competition during the London Exhibition of 1851, was that they "are very elegant and light, but seem hardly steady enough for breaking up an English clover-ley," yet at that very trial Hale and Spear's American plow showed a lightness of draft (which should have been otherwise with much *unsteadiness*) of 530 points of resistance against 540 up to 659 points shown by plows of the best English patterns.

The marked difference which strikes at first sight, between the American, (perhaps I should say Illinois,) and all foreign plows of acknowledged merit is that the mould-boards of the former are more upright and seem to present a more direct resistance to, amounting to a considerable pressure upon, the under surface of the rising furrow-slice, as it is thrown from the polished plate—a circumstance that would seem, if true, likely to tell against them in test of draft, but which in view of such test often made, it is to be concluded, is quite compensated for in some other manner.

To my mind, in this very pressure is to be found the excellence of the plow as a pulveriser; and all plows scientifically constructed on the principle of offering the least direct resistance or pressure upon the soil removed, will fail in this regard. No amount of cracking the furrow-slice, breaking it into cubes or sections by

twisting, and certainly no English plowing alone, will have the effect to comminute the soil or any considerable part of it, to a degree required by the plants it is afterwards to nourish. Positive pulverization—reducing to the finest particles—is the only condition in which soil can be serviceable, except mechanically as a bed, to the rootlets of the growing crop, and hence I have seen the gardener with his spade (that choicest of all tools, properly used,) dig up the earth and deposit it inverted *so carefully* as to deprive it of all power to sustain vegetable life in a moderately dry season. A single stroke with the back of the spade as each spit was turned over, would have given the equivalent to the pressure or resistance of which I have spoken afforded by the Illinois plow. After the English plow or any other constructed to turn the furrow with the least resistance attainable, the harrow must follow with its teeth reaching the entire depth plowed and the roller must pass and repass over it, giving the needful comminuting pressure, or the soil will not be in proper tilth.

Hence I believe the correctness of the principles upon which the plows of our best Illinois manufacturers, have been made to assume their present approved forms, short mould-boards and all, is fully established; and that the plows in whose construction those principles are applied, will in the future as in the past, give better satisfaction than others differently constructed with easier gradations and curves.

To employ a plow which handles the soil more tenderly than is consistent with needful ease of draft, is bad farming and worse science; and to use an excess of material in its construction is bad mechanism and worse economy. Hence, you will rightly conclude that I saw no implements of this class made abroad at all comparable to the Illinois plows for the purposes to which they are and should be applied.

The usual form of share and mould-board of our “prairie-breakers,” adapted to turning a thin slice of sod without any pulverization, very nearly approaches the approved English patterns, the depth of furrow being regulated at the farmer’s option.

SEEDERS.—It is as well understood in Europe that the seed-drill in its most important parts and best forms is an English invention, as that the Reaping and Mowing Machines are American. The French and others make good drills, but are free to

acknowledge their indebtedness to the Island across the channel for the chief features embodied in them.

The point of principal excellence is the device for dropping. Revolving vertically in the seed-box are as many thin cast iron circular plates of 6 to 8 inches in diameter, as there are dropping or guiding tubes in the drill; ordinarily ten to fifteen on a drill of four feet in width. Projecting at right angles, (that is horizontally) from near the edges of the plates, are as many cups (about $1\frac{1}{2}$ inches in length,) or rather pegs with the ends formed into cups of say $\frac{3}{4}$ of an inch in diameter—as may be required by the quantity of seed per acre to be sown. These cups revolving in the seed-box pass through the seed and carry it over to the hoppers in the dropping tubes, into which it falls when the necessary inclination is reached. These cups are removable, may be set at any inclination for delivery, and may be made of any desirable size, so that the quantity of seed per acre, of whatever dimensions, whether corn or grass seed, may be accurately determined. Any of the plates may be removed or thrown out of gear, to regulate the distance between the rows; the cups revolve in sight of the attendant, so that any derangement is soon observed; there is no cut-off or other device out of view or likely to be choked, or, in the operation of which, the seed is liable to be injured; the rate of revolution is dependent on the gearing and may be regulated as required. Pulverized fertilisers, lime, guano, etc., may be deposited with the seed, if desirable.

For efficiency, regularity and certainty, this device leaves nothing to be wished for.

The devices for guiding the implement vary. Some are very ingenious—some so complicated as to be practically useless—some are in the form of levers in front of the wheels and controlled by a man who walks and watches the movement of the machine; some are guided by a crank passing from the front, where it operates a cog gearing on a quarter circle, to the rear, where the arm enables a man to change the direction of the machine readily, etc.

I do not remember any drill upon which the driver rode, and very few have tongues or shafts, which are supposed to interfere with guiding properly. In all cases, I believe, the horses were led by the bridle. At least two hands, and generally three, accompanied each machine at work. The drill receiving the highest prize, a Gold Medal, is manufactured by Smyth and Sons,

Peasenhall, Suffolk, England. It is a combined seed and manure drill. Another, by James Coultas, of Grantham, England, pleased me very much. It drilled any kind of seed well and could be transformed into a broad-cast sower, simply by raising the tubes; width 4 feet; price in London £27 10s.

Of ROLLERS, HARROWS, SCARIFIERS, and other implements designed to prepare the soil and for tillage, there was, by several of the largest manufacturing establishments of England and France, an extensive, interesting and creditable show; but I observed nothing especially new or valuable beyond what we are already familiar with in this country.

The only American implement of this class which received an examination on trial in the field, was Comstock's Rotary Spader, which performed in a manner sufficiently satisfactory to obtain the award of a Silver Medal. This machine, well known to you, is apparently winning its way to public favor in England and is being introduced upon the continent.

MOWERS AND REAPERS.—It is not necessary for me to do more than refer to the results of the trials of these machines, which being essentially the offspring of American necessity for economizing hand-labor, have reached a perfection at home, far in advance of anything attained elsewhere, even by palpable attempted imitations of the most important parts of our inventions. It is not improper, because entirely within the truth, to say that at least ten different machines of this class are largely manufactured in this country, either one of which is superior to any made abroad.

The best European Reapers and Mowers were present at the four separate trials, (two of each) to which the jury subjected them, and, to any one acquainted with the successful operation of the American harvesters, in constant popular use, the fact just stated was abundantly plain.

The American machines represented by, and operated under the direction of, the manufacturers, inventors, or their American agents, were the C. H. McCormick's combined, of Chicago, Illinois; the Walter A. Wood's combined and single mower, of Hoosick Falls, New York; and the J. H. Perry's mower, of Kingston, Rhode Island*—all worthy representatives of this

*Mr. McCormick and Mr. Perry were present in person. Mr. Wood was ably represented by Gen. Tibbetts, of New York.

WOOD'S MOWING MACHINE.

S. J. ORR, N.Y.

national specialty. Other patterns of American invention, the machines being made in England and France, were also present, but their performance was not what would have been confidently expected under other circumstances.

The first day's operation was with the Mowers, Thursday, May 23d in a piece of mixed luzerne, clover and grasses on the Imperial farm of Fouilleuse, some six miles southwest of Paris. The preparations were made in a manner highly creditable to those having them in charge. The crop was of rank growth and in some places lodged—the weather showery. The bottom was soft, uneven, with frequent small hillocks and abounding in pieces of cherty rock, lying on the surface. It was soon apparent that not only the cutting qualities of the machines were to be tested, but the temper of the cutting apparatus, if not, indeed, the temper of the gentlemen most interested in the result.

The second trial of Mowers was held on the same field on the 27th of July following—when the second crop was found to be quite as heavy as the first, with the surface a little more favorable to good work.

As none but American Mowers received prizes for meritorious performance, I do not care to speak in detail of these trials, further than to say, that the test was a severe one, under which a very considerable number of the 19 machines entered, proved utter failures, and a large majority unequal to the completion in a workmanlike manner of the task assigned them—that on the part of the Jury it was conducted throughout in the most impartial and pains-taking manner possible, and on the part of the exhibitors with entire courtesy and the most commendable patience. The first and second prize machines, cuts of which I am enabled by favor of the makers, to insert in this report, richly deserved the honors so triumphantly won for themselves and their country, and which were freely bestowed by so competent a body of foreign judges.

The first day's trial of the Reaping Machines was held on the 26th of July, on a field of wheat, separated by a road from that cut over by the Mowers. The grain on one portion of the tract was badly lodged and tangled—the estimated yield about 30 bushels per acre. Sixteen machines were entered, and their positions determined, as in case of the Mowers, by lot. Mr. McCormick drew as difficult a piece to do good work on as any in

the field; some of the other American machines were more fortunate.

The result of the day's work was again to demonstrate the superiority of the American harvesters, but it was thought best to adjourn the trial and re-assemble on the following 30th day of July, at the Imperial model farm of Vincennes, adjacent to Paris on the west.

The field selected was in heavy oats, generally standing well, with a fair surface and occasional large trees, singly and in clumps. Each lot contained 27 ares—little more than half an acre. As a rule the machines performed better than in the wheat; nevertheless, the supremacy of the McCormick self-raker was plainly apparent in style and quality of work. The first rank was assigned to McCormick; the second to M. Durand of Paris, who operated a Seymour, Morgan and Allen machine of French manufacture; the third to Mr. Massey of Canada, who operated a Wood machine made in Canada; and another third to Messrs. Samuelson and Son of England, whose machine with the American cutting apparatus, did good work, but which, from the fact that the driver walked and another hand was required to follow, in order to watch and clear the sickle, would hardly be an acceptable present to an Illinois farmer.

At a previous meeting of the Jury, after full discussion, the same general regulations and arrangements for these trials, including the scales of points, were adopted as those established by the Board of the Illinois State Agricultural Society, for the trial of Harvesting Implements at Dixon, in July, 1862.

The report of the Jury, embodying in detail descriptions of the competing machines and of the many incidents of the trials, will soon be published, and I need not here repeat them in a less authentic form.

The prestige acquired in Europe, by Mr. McCormick in many public competitions, and especially the developments of the great trials during the Exposition of 1855 at Paris, in which appeared the McCormick hand-raker, the Manny hand-raker, and the Atkins self-raker, while they prepared the minds of the Jury and the public to anticipate the success of the American machines, yet in view of rumors that some of these latter had failed in the opinions of the juries there, to maintain their supremacy at certain recent trials in England, and in view of the unsparing efforts

of several large manufacturing establishments in Great Britain to improve on the construction of this important machine, I confidently expected much closer competition. One may almost conclude, therefore, that in the plans of the essential working parts, our Reapers and Mowers have well nigh reached perfection, and that the points of chief rivalry henceforth should be durability, by the use of the best materials; and reduction of cost to the farmer, by improving the machinery for their manufacture.

It was matter of regret that none of our Headers were present on this occasion. Their fame as harvesters had excited much anxiety in the minds of many to witness their performance, and I trust another such opportunity to popularize them in Europe will not be suffered to pass unimproved by those who are engaged in their manufacture.

HAY TEDDERS.—After mowing came the trial of the tedders. The sight to me was entirely novel. Under the weeping summer skies of the British Isles, hay must sometimes be made when the sun does not shine; and on their meadows, bearing two or three tons of grass per acre, it could hardly be cured at all “in the swath,” as it is generally cured with us; hence the operation of turning and scattering it for the purpose of drying it sufficiently to stack with safety, is always a heavy labor, oftentimes exceeding in cost the cutting.

Hay-tedders are therefore a British specialty, growing out of the exceptional meteorological conditions of that country, and have been used there in some form for sixty years. With their usual thoroughness and a most remunerative market among the wealthy proprietors of the realm, the manufacturers have succeeded in almost driving the old-fashioned forks from their meadows and during the past few years brought into use several implements of this class which seem to lack only what an American would put on them at once—a seat for the driver—to leave nothing to be desired.

It was an exhilarating sight to see the ten or a dozen tedders start upon their tasks, taking a width of about 7 feet 6 inches each, and throwing the grass up in clouds and backward by means of a reverse motion, from the tines of the revolving forks, until, but for the broad wire screens erected between them and

the horses, the latter would have soon been buried. "The work done by one two-horse tedder, is equivalent to at least fifteen women with forks," (so it is said; but as we in the United States do not use the same standard of measurement, each reader for himself, must reduce the "work of fifteen women with forks," to some intelligible quantity.)

Bullard's American hay-tedder, with the veteran safe-maker—Silas Herring—in the seat, entered into the contest, but while the back-action of this implement may be well suited to the purpose in this country, it evidently did not sufficiently stir the grass to meet the views of the Jury. In clover or luzerne, which should be handled somewhat tenderly, it was judged likely to give satisfaction, but not in the usual meadow grasses. It received an Honorable Mention.

The best tedder was adjudged to be that of W. N. Nicholson, of Newark, England.

Of HORSE HAY-RAKES there were some which performed tolerably well, or would have done so if the grass had not been too wet for a fair and thorough trial. I observed no point, however, in which any of them seemed superior to those in ordinary use here. Invention has kept pace with the necessities of the farmers of the United States, in the construction of hay-gatherers, as well as of mowers, until it is not likely our best models are excelled. No American rake was present, and there was therefore, no opportunity for direct comparison of performance.

FARM WAGONS.—The French and English carriages, vehicles of luxury, are so elegant in model and so highly finished in workmanship, that one is led to expect at least a modicum of symmetry and grace in humbler structures. The wagons made for the business of the express and transportation companies, are oftentimes of graceful proportions which in no way detract from their strength or durability; but, like most other things designed for the use of the short pursed million who form the working substratum of European society, farm vehicles are by no means works of art. The extraordinary weight of material employed in their construction, is warranted only by the hard surfaces of their universally well kept roads and the low price of iron. With tires three to six inches broad and one-half to one inch thick, the remaining parts are made proportionally massive,

only that the material seems in some instances to be distributed without much regard to the durability of those parts upon which the wear and strain are greatest. The contrast presented by the comparatively neat, tidy, well-proportioned and strong wagon exhibited by Mr. Schuttler of Chicago, was very marked, and its construction appreciated by the Jury, who awarded to it a Silver Medal—the only other prize of equal grade on wagons having been awarded to an English firm, who made an extensive show of vehicles. I observed no forms or devices in connection with the exhibition of these objects which struck me as new or remarkable for merit. I am not sure that the employment of carts instead of four wheeled wagons, for the transportation on large farms, would not be an improvement, and especially an economy of labor of considerable importance in this western country. The facility with which they can be unloaded and turned in many places which are inaccessible to wagons, is certainly in their favor. Nearly all the ordinary transportation of the rural districts in France, is done with carts, upon which they heap up in the most artistic manner possible, immense loads—often employing two or more horses *tandem*. I often saw a single pair of wheels bearing up a load of ten tons in weight and drawn by seven to ten horses hitched in the same manner.

Of ROOT-CUTTERS, STRAW-CUTTERS AND FEED-MILLS, there were many of both French and English manufacture, chiefly the latter.

If the people of Great Britain have a weakness more prominently marked than any other, it is for good, fat, ripe meats. If the farmers of the kingdom are more justly famous for one thing above another, it is that they have intelligently and perseveringly pursued the rearing of neat cattle, sheep and swine for the butcher, to better purpose and with evidently better success than any other farmers on the broad earth. If the climate and soil of Great Britain are better adapted to the practice of one branch of husbandry than any other, it is to the production of domestic animals and especially those that feed on the open pastures during the summer season. Hence it is that fully one-half of the entire surface of England is in grass; and as a supplement for the proper maintenance of so many animals during the winter, another

twelfth is cultivated in roots and forage plants.* Comparatively little hay and straw or roots are fed (except what of the latter are pastured off by sheep) without being previously cut and frequently cooked. Hence, too, comes the demand for this class of implements, as a prime necessity with the breeder, the feeder and the dairyman. The same economical practice obtains on the continent also, but not, I imagine, to the same extent as in Great Britain. This great interest is fully responded to by inventors and the great manufacturing establishments.

Most of the general arrangement and valuable parts of these machines are similar to those in use in this country, at least there is a strong family resemblance among the straw and root-cutters, inherited doubtless from inventions in use forty years ago.

The most popular straw-cutters of English and French manufacture are constructed with the knives on the arms of a fly-wheel which is turned cross-wise at the front of the feed-box. The cut material is thus projected against the revolving wheel, and in the case of hand machines, the constant shower of hay or straw and dust to which the operator is subjected amounts to a positive annoyance. The arrangement of the parts by which, as in some of our best models, the operator turns the wheel, standing meanwhile by the side of the box and behind the cutting apparatus, whether that be knives with a perpendicular motion or on rollers, seems to me better, because while it avoids the annoyance referred to, it at the same time, enables the operator to have an eye to the regularity of the feeding and to aid it when necessary.

The highest premium on Root-Cutters—a Silver Medal—was awarded to E. H. Bentall of Heybridge works, England; and on Straw-Cutters to the firm of Valck—Verey, Saint Dié, France—worthy, efficient machines, of which I would be glad to present a drawing to render a description of them intelligible.

Of Feed-Mills, I saw none superior, either for rapidity of work, or quality, or for any essential feature, to some of those exhibited at our State Fair in 1868. None of the mills on exhibition at

*In 1836 England had, of its whole surface:

In Cereals.....	33.2 per cent.
In Roots and forage plants.....	12.4 "
Hops and divers.....	0.3 "
Fallow.....	3.4 "
Meadows.....	10.3 "
Permanent pastures.....	40.4 "

Billancourt were tried with Indian Corn and were probably not adapted to grinding it, so that in this country where the maize forms the usual basis of all animal food, the essential requisite of a good practical feed-mill was wanting. A machine of this character, like one of those now introduced here, which could have readily shelled and at the same time ground 15 to 20 bushels of Indian Corn per hour, propelled by two horses, would have produced a decided sensation, and especially when it was ascertained that the same machine could grind oats, barley or wheat, quite as well, and that after passing through it 1,500 or 2,000 bushels, the grinding plates could be renewed at a cost of forty cents.

Of minor agricultural implements, forks, hand-rakes, spades, etc., the American manufacturers are certainly without rivals in any respect. The show of the Partridge Fork Works of Leominster, Mass., to whose case the Jury awarded a Silver Medal, could not have been equaled by selections from every other similar exhibit, either for excellence of material, fine finish, beauty of form or serviceable strength; and the specimens were only fair samples of their ordinary manufacture, with possibly a little extra polish.

I have thus referred briefly to the several kinds of implements of farm husbandry, which most attracted my notice. It is clearly apparent on looking over a lot of them made in Europe and designed for European use, that those who are expected to handle them either have not the taste to appreciate good tools of handsome form and appearance, or lack the ability to pay for the gratification of such taste, or that the manufacturers themselves are in fault.

There is evidently a mania in France for low-priced wares, all very well in itself, but having a tendency, it is feared, to encourage inferior manufacture. It has long been well understood in this country, that the *best* tool is on the whole the *cheapest*; and even in the days of slavery, more than one master found his interests well served by substituting the finest and most costly hoes and other implements from the best makers, for the rough productions of his negro blacksmith. Aside from direct pecuniary results, which are always satisfactory, there is a moral effect, a pride of occupation, produced on the mind of the laborer, however untaught and rude he may be, by the substitution of a neat, easily

handled, good looking tool, whether it be a manure fork or a reaping machine, for a clumsy, ill-looking affair, which soon makes itself apparent. England has heretofore been in the advance in this matter, but opinion in France is now feeling the force of the example set by some of the most enlightened and thorough agriculturists of the Empire who prize perfection more highly than cheapness. Gradually this appreciation will find its way among the small farmers, until rural employment there will cease, as it has ceased here, to be exhaustive labor, and the time thus saved will be applied either to refreshing social pleasures or mental improvement, or both.

Again, the popular effort among inventors of the United States is not only to lessen the number of hands required to perform a given operation, but to limit within the narrowest bounds, exactions upon the muscular power of the hands employed. Hence, in the construction of farm implements designed to be drawn by animals, the driver's seat, except in the case of single plows, and even in them sometimes, is generally provided. Nor is the quality of the work performed affected otherwise than favorably by these attentions to the comfort of the operator, while the aggregate achievement of farm labor relatively to its cost is thus greatly magnified.

No such considerations seem to have prevailed to modify the construction of implements abroad. Even the reapers and mowers of England, strange as it may seem, are as a rule, operated by at least two hands each, one of whom leads the horses, the other following on foot to attend the machine and be ready for any emergency—thus accomplishing less work, doing what is done no better and at much greater expenditure of human power, than under the American system.

In the multiplicity of humanitarian efforts in Europe, this field is not yet touched, and there is certainly great promise of bountiful harvests when the energy and capital of those interested shall be turned in this direction for the promotion of the physical and moral well being of their farm laborers. It *will pay*—pay the laborer, pay his employer, pay the implement manufacturer, and pay the country; and I trust another World's Fair will show that this ameliorating radicalism has been wisely adopted and fostered, even among less democratic communities than that in which it originated.

It is not necessary to speak of the Pumps, Mills, and various engines exhibited having relation to the distribution and preparation of fertilizers, because there was little of exceptional merit or superiority to those in use here; I therefore return to the Sixth Group in the Palace, leaving the specimens of Agricultural establishments and live stock for notice hereafter.

A highly educated gentleman, familiar with the history and present status of mechanical invention among the different nations of the world, and withal a European, after spending some weeks in looking over the multitude of contributions in this group, remarked to me while taking a survey of the United States' section, substantially as follows: "American inventions differ from all others in that they seem to have no parentage. Every European invention is clearly the child of its father, to whom it may be easily traced, but not so with yours; your inventors have struck out in new directions from new points of departure, and they have been amply rewarded." Of the truth of the remark the evidence was all about us. The flight which Telegraphy took in the hands of Morse and Field stamped it with downright originality; the genius of Fulton developed an application of steam power, which gave it all the attributes of a new elemental force.* To-day the harvest is not gathered anywhere by *machinery* not in its most essential parts of American invention, while the cotton-gin, the sewing and knitting machines, weapons of war and hosts of other implements and engines, born of the great needs of a common humanity and higher civilization, bear testimony to the daring fertility of American genius.

Among the American machines of recent invention was one, which, by the important rôle it is likely to play in iron manufacture and in the construction of buildings in the United States, as well as by its accuracy of mechanism, early excited my admi-

*Notwithstanding the inferential claim on the British window, heretofore quo ed, to the invention of the application of steam to navigation, Baron Dupin, the chairman and reporter of the Jury on Class 8, of the International Exhibition of 1851, at London, holds this language in his report on Naval Architecture, etc.: "Many persons, in various countries, claim the honor of having first invented small boats propelled by steam. But it is to the undaunted perseverance and exertions of the American, Fulton, that is due the everlasting honor of having produced this revolution, both in naval architecture and in navigation. When the general peace took place in 1814, there was not a single steamship in the ports of England; Scotland, however, had one small vessel of this kind. For several subsequent years, steam-boats of small size, and with very insignificant engines, were employed in rivers or along the coasts, but the idea of going far out to sea with them was very presumptuous. * * * * *

"In 1818, however, an American captain traversed the Atlantic in a steamship, the *Savannah*, touching first at England and then proceeding up the Baltic to St. Petersburg."

ration. I refer to the "Wickersham Nail Machine," invented by Wm. Wickersham of Boston, and first used, I believe, in 1864.

Until 1807, cut nails were made by clipping them, one at a time, from a bar of a width equal to the intended length of the nail; after which each piece so cut was put into a vise and the head formed by a stroke of the hammer. About the time named (1807) a machine invented by Jesse Reed of Massachusetts, cut the nails and headed them in one operation, one at a time; the bar being held, pushed forward and turned over at each cut, by hand. Except that, I believe, the bar is fed to the cutters by machinery in some instances, there has been little improvement in the process of cutting nails, until the appearance of Wickersham's machine. In this last a sheet of metal 20 to 25 inches square is placed and a series of nails cut from its edge at one stroke of the knives. By the use of bed and moving cutters, and a device for shifting the plate laterally, the nails are cut, alternately reversed as to heads and points. The nails are tapered their whole length and the points beveled. The machine is adjustable to cut shoe nails of the smallest size or ship spikes weighing $\frac{3}{4}$ lb each, and any size between these; using from 3600 lbs per day, up to 25,000 lbs, according to the size of nail cut. They are termed "finishing nails," but there is no reason apparent why they may not be safely used as board nails, and greatly cheapen the cost of the 3,000,000 kegs of nails, the 250 tons of shoe-nails, and the 1500 tons of ship-spikes, annually made in the United States. Few, if any cut nails are yet used in Europe—why, I cannot understand. Indeed, there was said to be neither a cut-nail, a claw-hammer, nor a common hand-saw in Paris, except what had been brought there from abroad, for purposes connected with the Exposition. The samples of nails and tacks on the shelves of the Society, are from the exhibition by Bavaria, and constitute a full series, resembling in general those in use elsewhere on the continent.

The percentage of awards, in the sixth group, to Americans is a flattering and valuable testimonial, and especially so when account is taken of the fact, already alluded to, that so many of the objects were of recent invention, and hence appeared at this great international concourse without the endorsement of acknowledged popularity at home.

The German States, France and Great Britain each presented rich offerings. The immense establishments of the two latter, particularly, were out in full force, and contested every inch of ground with each other by the most magnificent displays. If any reader would comprehend the scope of these displays, I commend to him the perusal of the enumeration of the principal items as they appear in the classification on preceding pages 29 to 32 of this report.

It was in this group that occurred the by-play of a contest with burglar-proof safes, after considerable diplomatic correspondence between Mr. Herring, of New York city, and a celebrated English manufacturer, the result being that the workmen selected by Mr. H. "went through" the British safe first, and Mr. H. had the pleasure of presenting the wager (30,000 francs) to charities selected by him in Paris, London and Washington. Soon after the opening of the Exposition, Mr. H. had placarded one of his safes, a very unpretending affair, with a challenge to the world for trial by either fire or burglars' tools, and this was the only acceptance.

The limit prescribed will not permit a more extended reference to the contributions in this important group, and I pass on to the SEVENTH GROUP, embracing in its numerous classes Food in all stages of preparation.

Whatever else a people may or may not do, they must eat and drink. Of clothing they may wear much or none; of the arts they may practice many or none; of knowledge they may have much or little; but simple existence demands the daily nourishment of the physical man, and the first human impulse is to supply it. Hence, all climes, all nations and all tastes, but the cannibal's, were represented, and especially all nationally characteristic dishes and drinks found a place in this group. If there be any organized animal substance, any creeping, crawling, walking, swimming or flying thing which *somebody* does not eat under the idea that it is *food*, I failed to make a note of it or my knowledge of the natural history of the animal kingdom was too limited to enable me to detect its absence. More than that: if there is any particular member of that kingdom more disgusting than another to *most* tastes, and not absolutely poisonous, *some* tastes seem to have made of it a sort of divinity, and installed it as their chief festive dish. But "*de gustibus non*

est disputandum"; the Chinaman has as good a right to his rat pies as the Yankee to his pumpkin.

By far the most important class of objects in this group was that which comprehended the cereals and their mill-products, of which the exhibition was complete.

The contribution from the United States, of which the collection from this State formed a very considerable part, was far from adequate to convey any just idea of the cereal productive wealth of the country; nor was there the careful, systematic arrangement of it as a whole, which characterized the exhibits of many other nations. The samples forwarded by the United States Department of Agriculture seemed to be in charge of no one, and many of them remained in baskets, under the tables, on the 1st of August. Those from Wisconsin, Iowa and this State were placed as favorably as circumstances permitted.

After all, our exhibition in this group, rightly viewed, was in general accord with the unsystematic, unbusiness-like, farming characteristic of a large mass of American agriculturists. It served to demonstrate somewhat the lavish bounty of nature under methods of culture not always pains-taking nor intelligent. It most decidedly commended itself as the faithful exemplar of a *mixed* husbandry, the diversity of which has its origin not so much in judicious effort to render available limited resources, as in a confusion of ideas and indistinctness of aim consequent on the possession of an over-supply of means. The housekeeper, with few rooms and many servants, has not the same excuse for untidiness as though there were a large house and few servants.

A comparison of wheats grown here with those of Prussia, Austria, or any of the German States, Belgium, France, Spain, Italy, Norway, Sweden, Great Britain, Australia and some others, develops at once the fact that the varieties with us have not been kept pure—that they have been crossed, time and again, by cultivation, until, with the exception of those recently imported and which have fallen into careful hands, there is much diversity of appearance and possibly of flouring qualities among individual grains of what we esteem a single variety. The samples before you sufficiently show this fact. How considerable, if any, is the real deterioration occasioned by this mingling of breeds of wheat must be determined by experiment. The serious feature of the matter is that it bespeaks a carelessness or unskillfulness of culture

which gives little promise of originating new varieties of permanent value or of improving old ones.

A comparison of the product of wheat culture per acre with the countries named is far from flattering to us, as the yield in Great Britain is about twenty-seven bushels, in France a trifle more and in the others not less. In all, however, except Australia, it is not unlikely the cost of production in labor and money (for manures chiefly) is greater than in Illinois; and this, without taking into account the interest on the cost of the land or the rent—far less here than there.

This difference in quantity of product in favor of the European farmer, is secured in good part by the more thorough preparation of the soil; by the application of special manures; by drainage where required; by careful selection of the best seed; by depositing it uniformly, at proper depth and at proper distance apart; by the entire extirpation of weeds, and by the most laborious economy in harvesting.

In gathering a crop of wheat, rye, oats or barley in France, the implement used to cut it is a common cradle; but the laborer cuts around the piece in a direction opposite to that taken by an American cradler. The grain, therefore, is thrown in against the standing grain, whence it is taken, adjusted into bundles and bound—usually by women. A sufficient number of women and girls follow to glean, and so thoroughly is the work done that on the imperial farm, at La Motte-Beuvron, I had great difficulty to pick up half a dozen heads of winter oats on a field from which the crop had been just taken. What may happen to be shelled out or overlooked by the gleaners is gathered by very obedient flocks of poultry or pigs, herded by old persons or children. The straw is sometimes purposely cut high in the harvesting, and afterwards mowed again and gathered for litter. Thus, absolutely, nothing is wasted in the harvest-field; *but the tracks of the wooden shoes are almost as numerous as the stems of the grain*; and if paid for at the wages of the harvest-field in Illinois, the proceeds of the crop, at Chicago prices, would probably be insufficient to square the account.

Samples in the State collection, contributed by gentlemen of St. Clair county, were admired, and exchanged readily.

The Jury pronounced the flour contributed by Mr. A. Zeiting,er,

of Monroe county, Illinois, as a very decidedly good article, and excelled by few in the Exposition.

The United States exhibition of Indian Corn had no rival, nor anything approaching it, for quality or quantity. Some varieties of this important grain mature as far north as Danzig, in West Prussia, where it is estimated at its true value compared with other grains. In a descriptive statement, relating to the exhibition of cereals and legumes by the West Prussian Farmers' Union Experimental Garden, it is said: "Indian Corn is of all kinds of corn (grain), that which gives the largest quantity of food for men and beasts; therefore, is the breeding of varieties qualified for the northern climates of the greatest importance. Trials, continued during five years, with more than thirty sorts of Indian Corn, have shown the forty-days'-maize and the King-Philip-maize as the most answering ones to the climate of this country. The former has ripened here absolutely every year—early and completely. Some maces (ears) of the latter demanded, in several years, still an artificial drying. In 1865 was the harvest from one acre of the forty-days'-maize, 1,555 pounds of maces (ears), without integuments, (husks), 1,166 pounds of straw, (stalks); of the King-Philip-maize, 1,272 pounds of maces without integuments, 2,215 pounds of straw."

The most interesting and perhaps the most instructive exhibition of maize was by the Imperial Royal Academy of Agriculture, of Altenburg, Hungary, embracing morphologic and anatomical pictures of the plant; forty microscopic objects; one hundred and six varieties in the ear; specimens showing the deformities of the ear and plant; collection of insects injurious to the ear and plant; tables showing chemical constitution of the grains and composition of the ashes of the grain; products of the maize for the nourishment of animals and composition of a crop of green maize; divers products of the grains and stalks; tables relating to its culture and use; cuts of implements of culture and of a frame for drying the ears. In the expectation of obtaining a large photographic copy of this entire exhibit, I did not transfer to my note-book but a list of the insects which attack the maize in Hungary, as follows:

1. *Stonobothrus variabilis*, L.; 2. *Decticus verrucivorus*, L.;
3. *Acridium migratorium*, L.; 4. *Tinea granella*, D.; 5. *Tinea cereallela*, O. K.; 6. *Botis silaceatis*, Tr.; 7. *Agrotis tritici*, L.;

8. *Plusia gamma*, L. ; 9. *Agrotis segetum*, F. L. b. ; 10. *Sitophilus granarius*, L. ; 11. *Melolontha vulgaris*, L. ; 12. *Melonomotus niger*, Fabr. ; 13. *Trogosita mauritanica*.

I am unable to account for it, but, with the exception of a few ears of Indian corn from Australia, I saw none so large nor seemingly so free from attack of insects as our own, and was careful not to include in my exchanges any, except two or three ears from Italy, and which have not been propagated from since they arrived here. I should deem it fraught with untold calamity if, by carelessness or design, the insects which depredate on the maize plant in Europe should make their way to the fertile fields and full granaries of this country. I did not observe a single ear grown outside of the United States, unless in Australia, which did not show marks on some of the grains of injury by insects.

In regard to the cultivation of the plant or its uses, nothing of value, not well known here, was presented.

The Maizena, or flour of corn, manufactured by the Glen Cove Starch Company, of New York, was most industriously exhibited by the agent for that company, during the entire Exposition ; and as a delicate pudding, garnished with strawberry sauce (a constant dish in the American restaurant near by), received encomiums enough from Europeans to assure its popularity on their markets in the future.

Our samples of corn were sought for by all with whom exchanges of seeds and grains were made, and by visitors, daily, from all parts of the world.

A sample of Surprise Oats, grown by Mr. Van Olinda, of DeKalb county, Illinois, and belonging to our State collection, was fully the equal of any other exhibited ; those from Norway most nearly resembled it, but were not superior in any manner, nor could I learn that crops of oats gathered elsewhere ever reached the figure claimed by Mr. Van Olinda—one hundred and thirty-three bushels per acre.

Among the many objects worthy special study in this group I can notice only few, and those far too briefly.

The DAIRY PRODUCTS of the old world play a very important rôle in the nourishment of the population ; and the cow, the sheep, the goat and even the ass are placed under contribution for their manufacture. Out of the magnitude of this interest, the

variance of conditions and necessities existing in different localities, have grown up a multitude of tastes, prejudices and notions, so that, for example, the richest and best American or English cheese, made from the milk of the finest cows fed on the choicest grasses, and having a flavor the most delicious to the unperverted taste, is thrown aside by thousands of *epicures* for a cheese made from goat's milk, with a pungent scent utterly repelled by the natural nose, and strong enough to give early notice of its presence to one approaching; or for another made from ewe's milk, into the curd of which was purposely introduced moulded bread and the *sporules* of a cryptogamic plant—the *penicellum glaucum*—the cheese when formed being placed in cool, moist caves, with atmospheric conditions best suited to the rapid growth of this fungus, and not reaching its most desirable flavor and richness until a *blue mould* has permeated and discolored the entire mass. This last variety is made at Roquefort, Department of Aveyron, France, and is extolled as the “King of Cheeses.” It claims great antiquity (the manufacture, not the individual cheese; although if claimed by the latter it would be admitted on sight without question), having been pursued as early as A. D. 1070; has steadily increased from an annual product, in A. D. 1800, of 500,000 pounds to, in 1866, 6,500,000 pounds, employing the milk of 250,000 ewes, and selling at the caves for about twelve cents per pound. The cheese is exported to all the chief cities of the world, including New York, where its admirers pay for it, usually, forty cents per pound. The estimated annual product derived from one ewe well cared for, whose milk is used for cheese-making, is: milk, 21 francs; wool, $5\frac{1}{2}$ francs; lamb, 4 francs; total, $30\frac{1}{2}$ francs; not including the manure, which is of the best quality and of considerable value.

I had occasion, as a member of the Jury, to examine in the Park a miniature dairy for the production of the Roquefort cheese, in which some of the sheep were kept and milked, the cheeses made and treated precisely in the imitation cellars as is customary at Roquefort. This establishment was exhibited by the “Society of United Caves,” and received the award of a gold medal.

The consumption of cheese in Europe is enormous compared with the United States. Paris consumes annually about 11,000,000 of pounds, and all France not less than 200,000,000 pounds. The proprietor of the English restaurant in the Exposition, a gen-

tleman whose long experience at the head of the profession in Paris gives authority to his opinion, informed me that a considerable quantity of cheese was imported into England and France, from the United States, of a quality quite equal to the best English, and which, in many instances, could not be distinguished from it.

I did not see, or rather taste, a particle of Butter which was not palatable, though not always high-flavored, during my stay; nor did I taste any which had been perceptibly salted by the maker. It was all thoroughly worked, and so pure as to retain its original soundness a long time in that climate. About two or three per cent. of sea salt is generally added in the course of the many workings and washings it is subjected to, but very little flavor of the salt is left. *Melted butter*, as it is called, is made by heating it either over an open fire or putting the vessel containing it into another in which water is boiling, skimming it as the scum rises, allowing the remaining impurities to settle, and then drawing off the clarified butter into stone jars; when cooled it becomes quite solid. The price varies from twenty-five to seventy-five cents per pound, and the city of Paris alone consumes, ordinarily, about \$5,000,000 worth annually. I have eaten both butter and cheese made in northern Illinois fully equal, in point of flavor and richness, to any I tasted at the English, French, German or other restaurants at the Exposition or elsewhere.

One of the chief products exhibited in this class was WINE. This subject is fully reported on by Messrs. Wilder, of Massachusetts; Thompson, of New York, and Flagg, of Ohio, United States Commissioners. Their report has already been published, and the wine-makers of this country have received the benefit of their suggestions. Of late the most important developments relating to processes for the preservation of wine, have resulted, from investigations by M. Pasteur, undertaken by him in 1863, at the request of the Emperor, and concluded in 1865. Having nearly 5,000,000 acres in vineyards, producing annually about 1,315,000,000 of gallons of wine, of an average value of nearly \$100,000,000, and exporting of wines and brandy distilled from the grape, a value of about \$80,000,000 annually, it is not surprising that some alarm should have seized upon the Government of France when it was found there was serious danger of

losing their foreign market for wines by reason of changes even the best samples underwent when subjected to the elevation of temperature and unskillful handling, unavoidable in shipping them to foreign parts. To the discovery of the "diseases," as they were called, and the remedy, M. Pasteur, of Paris, addressed himself and, as his report shows, with entire success.

The alterations and deteriorations were found, by a series of the most guarded experiments and careful microscopic observations, to proceed from the presence of vegetable parasites, spontaneously produced in the different varieties of the wine whenever the conditions favored; no varieties, from the *vin ordinaire* to the very finest, were exempt. He says "it is necessary to consider wine as an organic infusion, of a particular composition. All infusions give an asylum to some organized microscopic beings. Wine acts in the same manner. Such is the origin of the spontaneous alterations to which it is subject."* He repudiates the empirical "remedies" sometimes used, such as the addition of resinous pitch, as the Greeks and Romans made, or of sugar, or alcohol, or sulphurous acid gas, neither of which is efficacious, and all are otherwise objectional. In the course of his researches he, himself, experimented with substances inodorous and inexpensive, which, like sulphurous acid, possessed strongly de-oxidizing properties, but was entirely unsuccessful until he fell upon the remedy he thus announces: "To destroy all vitality in the germs of the parasites of the wines it suffices to bring the wine for some instants to a temperature of 50 to 60 degrees (centigrade = 144 to 172 deg. Fahrenheit). I have observed, moreover, that by this preliminary operation the wine is never altered." The wine may be heated either in bottles or in the cask by immersion in a tank of water at the boiling point, or, in casks, by the insertion of a coil, through which steam is passed. Plans of cases for holding the bottles and for all the details in conducting the operation are given. There is, seemingly, neither difficulty nor considerable expense necessary to prepare wine in this manner, so that it will be proof against deterioration or change of any sort.

I have thus briefly stated the points decided by M. P. so that those who care to do so can pursue the subject further. I believe the Longworth Wine Company and, perhaps, others have already

* Etudes Sur le Vin—par M. Pasteur, Membre de l'Institut, Paris, 1866.

adopted the practice recommended of heating their wines, or have at least experimented, with a view to test its efficacy.

For some reason the wines contributed to the State collection from Hancock county, probably as good as any of their class in this State or elsewhere, were found, on examination by the juries, to have undergone a change which seriously affected their value, and this, as well in those which were sealed with wax, as in those simply corked, though not quite to the same extent, perhaps, in the former. If I remember correctly no wines from the United States—and there was a large exhibition by the Longworth Wine Company and others—received a higher recognition than an “honorable mention;” but my impression is the French taste especially rejected them as table wines because of the presence of too much alcohol. While nearly everybody in Western Continental Europe drinks wine every day, there is neither a public opinion which will tolerate, nor seemingly an individual taste that cultivates intoxication. 60,000,000 gallons is about the quantity annually consumed in Paris. In 1867 there were probably not less than 100,000,000 gallons drunk there, the excess being during the Exposition; yet, in five months, I did not see more than half a dozen persons intoxicated, and a fair proportion of that number were Americans. The explanation of this, to my mind, is the abundance and low price of light table wines. Common claret is sold from first hands at six to ten cents per gallon.

There is, however, a class of wines manufactured for the American market very extensively, which do not assume a very high rank at home. At Châlons-on-the-Marne I visited one cellar, owned by Messrs. Jacquesson & Son, which is about 1,100 feet by 1,150 feet, cut into a chalk bluff, has some 2,000 feet of railway, with turn-tables, enabling an ordinary locomotive to pass in and out with cars attached, and, when I was there, contained 5,000,000 bottles of champagne wine, destined for consumption in this country. After bottling, the wine remains in the cellar about three years, during which time there is a loss from bursting of five to fifteen cent, although the temperature is maintained at ten degrees centigrade (fifty degrees Fahrenheit) the year round, with scarcely perceptible variation.

In the examination by the Jury of apparatus for the manufacture of wine, the most notable improvement of recent date was the use, in the fermentation, of a tub divided into six stories, by open

frame partitions placed horizontally, at equal distances from the bottom, from the top and from each other, the under side of each dividing frame being covered with coarse linen, permitting the free circulation of the liquid and gases, but confining the solid parts of the grapes, which are equally divided in layers between the five lower spaces, nothing but the liquid being in the upper. *It is stated* that the solid portions, during fermentation in an ordinary tub, remain at the top; that in consequence of this the temperature at the top is about fifteen degrees (centigrade) higher than at the bottom; that, therefore, the fermentation is more active and rapid above than below, and is thus prolonged to the injury of the wine product because of the absorption of alcohol by the solid portions; that the distribution of the crushed fruit throughout the entire mass by means of the *stories* in the tub, renders fermentation more active, therefore completing it in shorter time, and hence preventing the undue absorption of the alcohol by the solid parts; imparts a better color to the wine by preserving a uniform temperature and agitation during the period of fermentation, which continues not more than four and a half days, when the surrounding temperature is not below fifteen degrees (centigrade). The inventor is M. Michel Perret, of Tullins, President of the Agricultural Society of St. Marcellin, Department of Isère, France, to whom the Jury awarded a silver medal and object of art.

Of MALT LIQUORS there was an exhibition corresponding to the magnitude of the brewery interest and the well known fondness of Europeans for such beverages. In 1865 Great Britain and Ireland consumed, *per head of the whole population*, about twenty-three gallons; that is, a population in England, Wales, Scotland and Ireland of 29,070,000 (census of 1861) retained for home consumption, in 1865, 684,000,000 gallons of beer, besides 27,737,000 gallons of spirits and 11,994,000 gallons of wine—the last imported chiefly.

I have not the statistics of beer consumption in the German States. It is an accredited statement, however, that in the city of Munich more beer is drank daily than the quantity of water used by the inhabitants per day, for all purposes except in the manufacture of beer. The Vienna beer enjoys a reputation beyond any other; and the Austrian restaurant in the Park, supplied every

day direct from a Vienna brewery, was a popular resort, during the Exposition, for all visitors who feared to drink water away from home; when drank while tasting the most delicious bread in the world, baked in the adjoining Austrian bakery, it seemed to be entirely acceptable. Malt liquors are gradually extending their dominion even in some of the best wine districts of France, and stoutly contending in the popular market for the mastery with wine and cider.

I could not learn *why* it is that better beer is manufactured at Vienna than elsewhere; but there is no secret made of the processes employed.

Of drinks in general it was notable, on a comparison of the American restaurant in the United States' section with those of other nations, that, for variety of component parts, of flavors, of modes of serving and style, and, especially, for effectiveness at long range, the American beverages occupied the very front rank. Many an appreciating Frenchman, a phlegmatic German, a sensitive Italian, or an unimpressible Briton here took his first lesson in *mixed* liquors, and drew through a straw his first impressions of a mysterious art wholly unpracticed in old Europe, except in the mild form of the Englishman's "'alf and 'alf." The American Soda-fountain gave the first taste of ice-cream-soda to thirsting thousands, and established a popularity quite equal to that enjoyed at home.

EIGHTH GROUP.—Animals and specimens of agricultural establishments.

Reversing the order I merely remark in regard to agricultural establishments that, while there were models of complete dairies and other structures suited to special branches of rural industry in Europe, I observed none, either in general arrangement or special device, superior to those of the better class in this country, while every one of them was constructed on a plan forbidding their general adoption here, *i. e.*, the family of the laborer or person in charge occupied an apartment in close proximity to the domestic animals and under the same roof. If there be an American prejudice in rural economy wholly insurmountable, it is that which separates entirely the family dwelling from the farmer's barns, stables and pens. It is impossible to divest the American mind of the idea that only a low grade of civilization will tolerate a

proximity of the human and brute creation so close and so constant as rural life in Europe almost everywhere exacts, if not from the "proprietors" at least from the families in their employ.

There is one invariable feature, however, which should be imitated here—the provision for saving in cisterns all liquid manure and of composting the solid portions with any other refuse fertilizing material the farm may afford. For application on partially or wholly exhausted lands, pound for pound barn-yard manure is worth double the value of any other substance, and the farmer who, anywhere but in this virgin country, would feed his stock on "dry points," from which the rains carry all the droppings to a stream near by, would very soon cease to have anything to feed.

If those who are so improvident could but witness the almost painful anxiety of the farmers of the old world to husband every particle of every substance that may perchance add another grain to their harvest, and observe, too, their elaborate and ingenious devices to guard against any waste of the precious material, I am sure it would have a reformatory effect on their practice.

If only the cities and villages of Europe should cease to return to the fields and gardens of the country their manurial products for one or two years at most, the result would certainly be widespread famine, and so closely are these utilized that, but for the noxious and valueless refuse of factories along its banks, the waters of the Seine, after flowing for six miles through the midst of a population of 2,000,000, would pass on to the ocean, for all that, almost as pure as a mountain brook. Processes by which the most offensive matter is instantaneously deodorized enable large establishments in the heart of the city to receive and transform into inodorous packages, for commerce, what would otherwise have to be saved in a more obtrusive manner.

All good farm steadings I saw in France are square or rectangular, of dimensions suited to the wants of the farm; the dwelling, stables and structures for stock of all kinds forming a continuous line and facing inward. In the middle is a square, uncovered lot of corresponding size, surrounded by a stone or brick wall; the bottom of the lot paved usually, or cemented with water-lime or otherwise rendered impervious to water, and sloping regularly from all sides to a cistern in the centre, in which is placed a pump. The manure from the stables, pens, poultry-house, etc., is daily deposited in this lot, the liquid manure some-

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THE AMERICAN COTTAGE.

times being drained in pipes into this cistern, and sometimes collected in others in the stables. Regularly the deposits in the lot are wet down from the central cistern by means of the pump with hose attached, and gradually prepared for carting to the fields. The liquid manure is carted out in casks furnished with sprinkling apparatus, and is usually applied to the meadows or crops of growing vegetables.

The AMERICAN COTTAGE, forming part of the Illinois State collection, as before stated, was one of the Agricultural Establishments on Champ de Mars. The Jury reported in regard to it as follows:

"It does not enter into our plan to speak of those houses which are exclusively within the domain of speculation, but we cannot consider the building exhibited by the United States as belonging to that class, inasmuch as constructions of this kind may be the basis of extensive operations and are destined particularly to assist in colonizing those parts of North America still uncultivated and uninhabited on account of this, therefore they have a tendency eminently useful and philanthropic.

The model placed in the park of the Champ de Mars, was built at Chicago, by Lyman Bridges, and sent to Europe in the same condition as is customary for these houses to be sent by builders to the farmers and others who order them. By the provisions of the homestead law of the United States, the new settler receives a grant of 160 acres of land, the fertility of which is such, that with moderate labor, he can raise almost immediately, the most remunerative products, which will enable him soon to pay for a house.

With this state of things the farmer and new settler finds little difficulty in securing from the principal cities of the West and particularly in Chicago, a house similar to the specimen exhibited, upon easy terms. Very limited resources are sufficient, under these circumstances, for undertaking the cultivation of a farm, and thanks to the house which can be procured so promptly, the settler escapes the privations to which he otherwise would be exposed, at least at the commencement of his undertaking.

The price of a house of this kind can be raised from \$500 (2,500 francs,) to \$1,500 (7,500 francs). That exhibited at the Champ de Mars, is at the latter price, and is sufficiently commodious and comfortable and of very pleasing design.

It is composed of three sections on the ground floor, which form a kitchen, a dining room and a parlor; there are also three bed rooms in the second story.

The out houses are entirely independent, and are generally placed at some distance from the dwelling.

The house is made entirely of pine lumber, which can be obtained at a low price in that country; and all the parts, such as the rafters and carpentry work, are of the most simple construction, so as to allow it to be rapidly made in the work-shop and easily placed upon the site determined upon.

By this arrangement the house in the Champ de Mars was built, delivered to the railroad company, carried to New York, near 1,000 miles, and shipped upon the

steamer for transportation to Europe, in 12 days from the day the order was given for its construction.

The number of dwellings similar to this in Chicago and the other portions of Illinois and the neighboring States, is becoming very numerous, and although the object for which this work has been undertaken has been to supply a need altogether local, yet the results have become important and none the less interesting.

The most striking fact is that the great increase of the population in these new localities has created a large and growing demand for this and similar buildings, which in itself indicates the value of a development of such an industry, and illustrates also the great facility with which comfortable homes are secured upon the fertile and inviting lands of the new States of North America."

The Farmer's Home was installed in the Park of the Exposition, among the spacious and elegant palaces of the sovereigns of Europe, near and adjacent to the free common school house; constituting the *American Quarter* in the Park, and the centre of attraction for the curious and interested from all portions of the world.

The books, maps, newspapers, and all other printed matter belonging to the State Collection, were there deposited under the guardianship of a young American of Italian nativity, who had served the country during the late war, and whose knowledge of modern languages and general intelligence, well fitted him for the position.

DOMESTIC ANIMALS.—The recent prevalence of the rinderpest, operated to limit the exhibition of Cattle almost entirely to France. Neither were there many specimens of horses or other stock exhibited by other than the French people. Nevertheless, there were exhibited some of almost every race of domestic animals, and either at the exhibition at Billancourt, or in the country, I had an opportunity to see them all, and shall speak of them in general terms without unnecessary detail.

And first, HORSES. The only French breed possessing peculiar merit is the Percheron, of which the General Omnibus Company of Paris use 9,750, most if not all stallions, I believe.*

*From January 1 to June 30, 1867, this Company did business as follows:

Omnibuses per day.....	750
Horses.....	9,750
Trips.....	1,120
Velocity per hour.....	12 Kilometers.
Distance traveled by each horse per day.....	15.50 "
Passengers per carriage and per day.....	436
Total number of passengers in six months.....	59,310,000
Total receipts for fare.....	11,307,000 francs.

In ordinary years, the number of passengers carried in twelve months is about 80,000,000. I am indebted for the above figures to M. Mille, chief engineer of highways and bridges, Paris.

The work performed by these horses will be realized when it is remembered that ordinarily two of them are hitched to a two-story 'bus with 26 places for passengers, 14 inside and 12 on top, and that including the driver and conductor, they take 28 persons up hill and down, over the hard pavements of the city, at a steady trot. They are almost uniformly gray; of an average weight of 1150 to 1200 pounds; generally about 15 hands 3 inches or 16 hands high; plainly formed, without pretension to special beauty or graceful action; clean, flat, bony and sinewy limbs; eye not usually very full; patient, but spirited enough for ordinary work; hardy and long-lived; altogether, except in color, they come up to the standard of a first-rate horse-of-all-work. They show a strong resemblance, in some respects, to the Norman horses brought to this country from France, and are doubtless related to them; but rarely have as much length of hair on the fetlocks and are usually more active. I have seen descendants from the old Norman horse, "Napoleon," at our Fair, which would probably pass for the true Percheron in Perche.

Of horses, distinctly *trotters*, the only European family is the *Orloff*, of Russian origin. The celebrated stallion, "Bedouin," from Moscow, a competent American trainer told me, was nearly or quite the equal of Dexter. Several others of the same family were present, and attracted much attention. This breed is made up of fortunate crosses of the English, Arabian and other stocks. The stallion referred to is black, but there is no distinguishing color to the family.

Of all the other varieties of horses which have any more than a local celebrity, except perhaps the Scotch Clydesdale and the Cleveland Bays, there are plenty of specimens in the United States, from the English thorough-bred and Liverpool draft-horse, through all the intermediate grades, to the monkey's favorite Shetland pony.

HORNED CATTLE.—The stability, the almost immobility of European communities, their limited intercourse, social and commercial, prior to the railroad era, had for result the development of a race of cattle suited to the conditions of agriculture and necessities of the population in districts of country often quite limited in extent. Naturally, the inhabitants, taking whatever sort of stock they might originally possess, would select and retain for propagation, such individual animals as best suited their special needs, begin-

ning at an early day to breed in-and-in, until within a few years they must have had in each restricted locality a race of animals homogeneous in appearance and of qualities uniform and firmly fixed. Continuing this for many generations, each race must have assumed all the characteristics of a distinct breed as we find them to-day. Hence in Western Europe, alone, are found the Durham, Hereford, Devon, Alderney, Jersey, Ayrshire, Argyleshire, Welsh, Irish, Brittany, Morvan, Charolaise, Jurassian, Limousian, Garonnaise, Hollandaise, Normande, Vendean, Aubrac, Gascon, Flemish, Picard, Marche, Auvergnat, Lourdaise, Parthenaise, Tarentaise, Bazadaise, Comtoise, Swiss, Holstein, Jutland, Tondern, Marsch, Wilster, Angeln and others. Specimens of nearly all these were exhibited by French proprietors, as pure breeds. After looking at them with some care, and obtaining whatever reliable information I could in regard to such as we do not know all about here, I feel some confidence in expressing the opinion that, taking everything into account, the Durham has no equal for beef, the Devon for work, or the Ayrshire for quantity of milk; that for quality of milk, the Alderney, Jersey and Brittany are of about equal merit. I am aware the Hereford contends in some localities with the Durham for beef and with the Devon for work, but I think maintains a very unequal contest. The popular verdict has settled the question in England, where reputable breeders of the Durham rarely fail to sell every surplus animal for breeding purposes, while a large per cent. of the Herefords go direct to the shambles; and this, too, in the face of the fact that the number of Durhams reared, largely exceeds the number of Herefords. The Normande race, in the hands of Comte de Kergolay of Canisy, France, is claimed to combine in a remarkable degree excellent milking qualities with superior aptitude to take on flesh; and in view of his successful efforts in this direction, the Jury awarded to the exhibitor a Gold Medal.

At the Imperial Model Farm of Vincennes, where 100 cows are kept for milking and the sale of the product in Paris, the varieties are Ayrshire, Brittany, Swiss, Normande and Flemish, which, as Mr. Tisserand informed me, taking into account the food consumed, rank for quantity of milk in the order I have named them.

One Gold Medal and nine of Silver were awarded by the Jury to gentlemen in Belgium, Switzerland, Prussia, Bavaria, Grand

Duchy of Baden, Wurtemberg, Hesse and Grand Duchy of Luxemburg, for measures taken by them to prevent the spread of the "contagious typhus" (rinderpest) among horned cattle, in their respective localities; the measures consisting chiefly of regulations to prevent the introduction of stock from the infected districts.

SHEEP.—In speaking of Wool on preceding pages, I mentioned what was supposed to be of practical importance to us of the West so far as the production of the fleece is concerned and the amelioration of our common breeds of sheep to that end.

For mutton of fine quality, the English Southdown heads the list wherever known; although I saw and tasted at LaMotte-Beauvron, a formidable rival in a cross of that breed with the native breed of Sologne. The latter is a small, game-looking animal, with dusky colored, bare legs and face, short, coarse wool, easily kept on the shortest herbage, very hardy, and with flesh of most delicious flavor. The cross retains much of the game appearance of the one, while partaking of the greater size and squarer form of the other.

For mutton *and* valuable wool, the Leicester (improved) of England, takes the first rank, though, like the pure Southdown, must have abundant food and proper care. Among the Merino family the divisions made in awarding prizes were: *Rambouillet, wrinkled, not wrinkled, mixed, Negretti and silky-Mouchamp*.

If there be a race of domestic animals indispensable to agriculture on old and partially exhausted lands, it is sheep. In all judicious efforts to reclaim worn-out soils, some varieties of this race, for their ability to thrive where cattle or hogs would starve, and for the comparatively rich returns they make for the food and care bestowed upon them, are regarded as of the very first importance.

HOGS.—For everything desirable in this "best of all assimilators," the English breeds are confessedly before all others in Europe. Starting with a cross of the Chinese to secure fattening qualities, intelligent selection and subsequent crossing have produced at least one good and distinct variety in almost every shire in England. These have been transported to the continent of Europe as they have been to America, and form the elements of every good race they or we have. The Berkshire, Yorkshire, Suffolk and Middlesex are most esteemed in France.

POULTRY.—The show was very large, but no description would be intelligible without cuts of the birds. I observed about thirty distinct breeds of chickens, among which the Crève Cœur, La Flèche, Houdan, Padua, Bantam, Dorking, Hamburg, Brama-Pootra, Black Spanish and some varieties of the Game were most conspicuous.

DOGS.—This to me was the most curious exhibition at Billancourt. Some twenty odd breeds were represented—all pure and distinct, except in cases where it was being attempted to form an improved one by crossing. Rarely is a mongrel or “cur of low degree” found in the old countries. Reared for special service, each race is generally preserved without alloy.

From large packs of hounds, or the immense Danish mastiff, down to the six ounce poodle on its silk cushion in glass case, all the varieties of hunting, watch, useful and fancy dogs were there. For intelligence, the “artist’s companion,” the *caniche*, a sort of spaniel, often seen as the “performing dog” in traveling shows, seems to excel. The whole collection to me, however, had little interest, as, except the terrier and shepherd, civilization could well spare them, poodle and all.

THE NINTH GROUP.—This country may congratulate itself on having sent as Commissioners, the gentlemen who had the cultivated taste and sound judgment to appreciate the wondrous wealth of horticultural display, which presented itself at the Exposition. The genial and enthusiastic Mr. Wilder, the noted practical nurseryman Mr. Barry, and the discriminating pomologist, Mr. Thompson, fairly reveled in the delights of the Reserved Garden in the Park, of the Experimental Grounds at Billancourt, and of their professional visit to the home of the vine at Johannisberg, where they tasted “nectar fit for the gods”—and they return richly laden with the fruits of their observations, to share them with their horticultural brethren of the East, West, North and South. I might therefore well be excused for entire silence in regard to the exhibition in this Group.

Up to 1867, singularly enough, Horticulturists had never been invited to participate in International Exhibitions. In such a paradise of horticulture as France, the Industrial Exposition of '55 must have seemed strangely deficient in failing to provide for a display of the riches of an art that covers the scars of the em-

AMERICAN PRIMARY SCHOOL HOUSE.

pire with a mantle of beauty. As though to make amends for past neglect, the programme of the Ninth Group contemplated the fullest possible encouragement in every department. The response which came in the form of contributions from the horticulturists of France, Holland and Belgium, particularly, and the immense satisfaction it afforded to all visitors, testify to the wisdom of the proceeding.

Like the exhibition of animals, that of plants and cultures was divided into fourteen lots, extending through seven months, so that the flowering and fruiting seasons of each series was covered. More than two thousand entries were made. Of Conifers alone, the permanent plantations by different exhibitors, were about fifty; number of specimens some 3,000, and the number of species and varieties about 900. There were more than 400 exhibitors of fruits, a display which came off after I left. Mr. Leroy, of Angers, and, in fact, every other nurseryman of note in Belgium and France, was said to have taken part. During the whole six months of the Exposition the Reserved Garden, with its elegantly constructed green-houses, aquariums, cascades, streamlets, lakelets, rustic bridges, arbors, pavilions, flower borders and gay crowds of promenaders, was more like a fairy-land than reality; and it would seem like downright vandalism to coldly attempt a discovery of the means by which such enchanting effects were realized. With all the immense mass of material in limited space nothing was crowded; with all its art nothing could seem more natural; with all the labor expended one could scarcely feel that an effort had been made, so easy, so natural, so charming was everything that met the eye of the looker-on.

Of the TENTH GROUP, embracing the whole subject of Education as well as all measures adopted to improve the moral and physical well-being of mankind, I do not propose to speak further than to refer briefly to the contribution from this State. The Illinois school-house, constructed by Mr. Lyman Bridges, of Chicago, at the instance of those who felt the importance of at least some pronounced assertion of the obligation of the people of this country to our system of free popular education, with its furniture, apparatus and books contributed by Messrs. Sherwood & Andrews of Chicago, was, perhaps, the most entirely plain and unpretending structure erected by any nation on Champ de Mars.

It was, however, accepted by the intelligent people of other nations in the spirit which sent it there. Its severe simplicity, in the midst of such surroundings, inciting inquiry all the more, was interpreted truthfully. I can convey no better impression of the view taken of it than to quote briefly from the remarks of Mr. H. Ferte, late Chief of Primary Instruction in Paris, as published in the *Manual General of Primary Instruction* and translated for the Chicago Republican.

After referring to the statistics of school attendance and the sums expended in Illinois for the support of its free schools, and mentioning with half-way approval the fact that female teachers outnumber the male teachers, he goes on to say:

"In building up in the Champ de Mars, with the timber and lumber cut in the vast forests of the State of Wisconsin, the model of a primary free school, the representatives of the United States have not had, certainly, the mere idea of showing how, in the new and small localities, the school-houses are quickly and cheaply raised in excellent hygienic condition; they have, in addition, made known the first and the most important wheel of the system of *universal education*, which, since the beginning of their independence, has been, and always will be, one of the principle causes of their grandeur and prosperity.

"The free primary school in America is truly the common centre whence have sprung up the greater number of the men who have shed luster upon the commonwealth. It is there that were formed those energetic nations who have developed, in such a prodigious manner, the power of the United States. It is there that were blended together the Saxon, French, German, Spanish, Italian and other races which people the new world. Each one, on landing on these remote shores, brought his own manners, his language, his national spirit, his opinions and tastes. All these unevennesses and differences disappear in the new educated generation, to form only one great nation—homogeneous in its patriotism, persevering and enlightened in the accomplishment of its political and other duties, audacious and powerful in the realization of its gigantic purposes and destiny.

"All these wonderful results are due in a great degree to the primary school, where the young generations are moulded, and where they have learned that *equality* and *liberty* can live together in perfect harmony.

"It is not then without cause that, instead of one of those magnificent establishments destined to the uses of a superior education, of the free grammar and high school, such as exist in the principal cities of the Union, that the American Government has preferred to give the model of the *inferior rural school*, which performs its full share in the useful and happy influences we have just described."

I have thus mentioned, and but little more than mentioned, each of the groups into which this last and greatest of all industrial exhibitions was thrown. During the summer, opportunity offered to see something of the practical agriculture of France by occasional visits to some of the Imperial farms, which I gladly embraced. Those I saw are on lands which, a very few years

since, were regarded as absolutely exhausted of all fertility. The present Emperor, in some instances, had acquired title to them during his presidency, which vested in the State on his becoming Emperor. Some twelve years since M. Tisserand was called upon to direct the reclamation of these waste and uncultivated estates on a business basis. Unaided by outside revenues to any considerable extent from the beginning, he has gradually restored them to fertility and rendered them not only self-sustaining but sources of considerable profit. The farms at LaMotte-Beuvron, in Sologne, and near Châlons-sur-Marne, are most remarkable examples of practical success under circumstances the most discouraging. The latter are situated on the chalk plains of the Champagne district, embracing, probably, the battle-ground on which Attila was defeated in A. D. 451. Many of the burial trenches, in which the hundreds of thousands of the slain were deposited, were plainly to be seen; and I was shown some fields of *luzerne* (the great ameliorator) on which the mouldering ashes of the dead had been recently scattered, with a view to test their fertilizing properties. The surface of the country in that whole region is wonderfully like that of McLean county in this State—high and beautifully rolling prairie, with occasional groves of Scotch pine which had been planted and managed to live. The soil consisted of three or four inches of browned material, underlaid with chalky pebbles resting on the solid chalk, so that when Mr. T. commenced operations he was met by the comforting assurance from a neighboring oracle that he “could carry all that farm would ever produce on the back of an ass.”

The farms in Sologne were, if possible, still more unpromising. With a soil (if it may be called so) impervious, barren of nearly every vestige of humus, producing nothing in many places but bad herbs and useless grasses, it came to his hands in the most uninviting shape. The site of the present model farm of Vincennes was little better than the foregoing. But Mr. T. has triumphed over all difficulty and has demonstrated that the old scars of the surface may be healed—that past improvidence is not equivalent to utter ruin. In the next volume of the Transactions of the State Agricultural Society I hope to insert many interesting facts in regard to the processes of culture, of handling domestic animals and especially an abstract of the most admirable system of accounts, as practiced in the course of these really

remarkable and most important experiments. The following balance sheet for one of the twenty-four farms will afford a slight view of the book-keeping as well as of the general character of the farming pursued on all of them. Having been, originally, one of the poorest tracts in the chalk district of Champagne, the success, as a matter of business, is complete :

IMPERIAL QUARTER, No. 1.—Camp Clâlons, (Marne.)

EXPENSES—December 31, 1875, to January 1, 1867.

		F. O.	
		F. C.	
ADMINISTRATION.....	Proportionate share of the general cost		2447 62
SERVICE OF THE FARMS	Salaries and indemnities.....		8140 54
COST OF CULTURE.	Manual labor.....	4611 43	4697 53
	Purchase of fertilizers..	761 cub. met. manure from the camp.. 96 k. of sel-gris..... 640 k potassic s l's of Starsfurt..... 2200 k. potassic salts and super-phos- phate of lime	2791 76 15 0 269 10 564 23
	Purchase of seeds.....	150 k. forage plant seeds.... 1000 k. potatoes	188 03 55 00
			243 03
			8572 25
	MAINTENANCE OF MATERIAL	Equipages—repairs..... Store-house utensils..... Plows, etc.—repairs..... Hand utensils	183 95 12 40 106 75 90
		Stable utensils	17 45
		Sheep-fold utensils.....	16 85
		Dairy utensils.....	130 55
		Threshing machine.....	112 85
MAINTENANCE OF ANIMALS..	Horses—shoeing, harness, etc.....	481 73	581 70
	Cow stable, salt, etc.....	60 60	
	Rams—shearing, etc.....	171 80	
	Sheep-fold—shearing, etc.....	364 05	
	Piggery—purchase	144 80	
	Bell	82 95	
			1305 93
			1887 63
	Total money expense.....		21,254 04
	<i>Expenses in kind.</i>		
ANIMALS	Rec'd fr. other farms—36 Rams.....	898 20	
	“ “ 1 Colt	200 00	
	“ “ 4 Hens	5 00	
			1103 20
DIVERS COMMODITIES	“ “ 150 k. Vetches .	45 00	
	“ “ 10 k. Clo. seed..	13 00	
			58 00
			1161 20
	Total general.....		22,515 24
	Expenses of buildings.....		1,234 43
			23,749 67

RECEIPTS.

		VEGETABLE PRODUCTS.			
		F. C.	F. C.	F. C.	
DIVERS COMMODITIES.....	9,400 k. of wheat	3077 73			
	1,675 k. wheat straw	117 25			
			3195 00		
	20,100 k. rye	4248 00			
	4,000 k. rye straw	192 00			
			4440 00		
	1,200 k. winter barley		228 00		
	18 k. barley		2 90		
	604 k. oats		169 16		
	3,551 k. potatoes		196 72		
	4,400 beets		8 89		
	1½ k. turnip seed		3 00		
	2,500 k. buckwheat		300 00		
	603 k. grass		71 40		
				8614 89	
		ANIMAL PRODUCTS.			
		F. C.	F. C.	F. C.	
COW-HOUSE	5 fat cows and 1 hide	985 80			
	10 sucking calves and 1 skin	384 52			
	1 steer	179 55			
	2 leaps	6 00			
	30,400 liters of milk	4734 36			
RAMS			6290 23		
	12 lettings	1155 00			
	44 wethers and 1 skin	2035 16			
	378 kil. of wool	1069 74			
SHEEP-FOLD			4259 90		
	3,275½ k. wool	9258 65			
	72 ewes and 22 horns	3567 44			
	2 yearlings and 154 lambs	3951 96			
	164 skins	54 85			
			16,832 90		
PIGGERY	1 sow		184 24		27,662 97
POULTRY-HOUSE	174 eggs and 10 chickens		35 70		
MATERIAL	91 k. old iron				7 31
	Total receipts				36,225 26
		Receipts in kind.			
		F. C.	F. C.		
ANIMALS	Delivered to other farms—12 calves...	163 15			
	“ 20 rams	600 00			
DIVERS COMMODITIES ...			768 15		
	“ 12,964 k. of grass	1181 52			
	“ 10 k. luzerne seed	12 00			
	“ 115 k. winter vetches	23 00			
	“ 850 k. of wheat	280 50			
	“ 1050 k. of oats	231 00			
			1728 02		
MATERIAL	Delivered to the domain of Sologne, 1				2496 17
	hay-tedder				275 00
	General total				38,996 43

RECAPITULATION.

Total receipts	38,996f.43c
Total expenses	22,515 24
Excess of receipts	16,481f.19c

Certified :

EUGENE TISSERAND.

I will only add that while a cultivated taste is apparent in the arrangement of grounds, structures, etc., there is no attempt to *make a show* at the expense of economy; and although these farms are "imperial" they are, under their present management, models which the masses there may imitate.

The QUESTION OF FORESTS and of tree-planting, with a view to the future demand for timber as well as to climatic effects, is as interesting to the people of the prairie country of the United States as, perhaps, any other. It seemed to me that important facts bearing on this subject and amounting, in some sort, to demonstration, ought to be obtainable by consulting the experience of the old world, which had really passed through all stages of transition, from a densely wooded region sparsely populated to a sparsely wooded region densely populated; once a forest almost without people, it has gradually assumed the condition of a prairie full of people.

At the Imperial Forest Tree Nursery,* in Sologne, I had the pleasure of observing that branch of horticulture prosecuted in the most complete manner, and of examining the permanent plantations on portions of the farm. During this trip I learned that the best minds in Europe were by no means agreed on even the fundamental principles involved in the question of forests, nor even upon the principal facts of European experience. The most recent publication on this subject, emanating from a source entitled to consideration, is a review, in 1866, by Mr. Tisserand, of a work by M. Vallés, Chief Engineer of Bridges and Highways, Paris, 1865, on the Alienation of Forests. The views expressed are diametrically opposed to popular opinion, there as well as here, but are well sustained by facts. There is only space in this report for a brief statement of the points of the argument. He commences by saying:

"If one could doubt the importance of method in the search after truth, it would suffice to demonstrate it to observe on what a flimsy foundation some opinions, highly accredited, rest, and with what facility light is made day on certain questions when one applies to their study scientific rigor and precision. There are circulating in the world numerous opinions, which are received and transmitted without examination, which thus acquire the authority of well established truths, and which could not, nevertheless, resist the least discussion.

The main avenue of this nursery has been christened the Avenue of Illinois.

"The question of forests, which has lately excited such lively controversies, offers us an example of those prejudices which have succeeded not only in taking hold of the common mind, but even in dominating the opinions of some *savans*. To every one who reflects, it seems that it must be with forests as with every other production of nature; that is to say, their utility varies with the conditions of the soil, of the climate, the position of the ground, and their preservation depends on the economic surroundings in which they are found placed. Nevertheless, certain positive minds, who have asserted the "utility of forests" as a scientific dogma, refuse to admit this, and on the faith of their word too many people are disposed to believe that the possession of considerable timber is always an advantage to a country, whatever may be the nature, the position and the value of the ground it may occupy.

"This country (France) is properly stirred up by all the discussions which have taken place. To-day, in order to remove the cause for the uneasiness occasioned by the presentation of a project for the alienation of forests, that minds may be calmed and cool discussion allowed, it is proper to replace the question on its true ground—that of facts; hypotheses, personal notions, from whatever respectable source they may emanate, are valued only as they are founded on the principles of science and on incontestible observations.

"The time is no longer, in fact, when the word of the master is sufficient to stamp an idea with the rank of absolute truth. The modern mind, in freeing itself from this servitude in regard to the doctrines of the past, has given to the sciences a new impulse, and permitted them to attain the elevated regions to which they have drawn in their path human industry."

His main propositions are: 1st—The development of population and wealth in a country is incompatible with a wooded condition; hence the clearing of lands fit for cultivation cannot be prevented. Witness England, which Cæsar called "*Horrida Sylvis*," where public clamor, instigated by necessity, has, in the face of acts of Parliament and the efforts of the Admiralty, reduced the wood lands to scarcely 65,000 acres. The prosperity of a country is in inverse proportion to the extent of its forests and uncultivated tracts. Cultivable lands are more profitable in tillage than in forest.

2d—The presence of forests has no other effect on the salubrity or humidity of the atmosphere, than plants of culture; that trees are composed of the same elements, and practically of the same quantity of each per acre, as the cultivated crops would be on the same soil. They do not deprive the atmosphere of more of the irrespirable gasses, nor do they restore to it more of oxygen than the others. Their physiological functions are the same, the only difference being that the meadow grasses condense and therefore evaporate five or six times more water than trees; and to this he refers, as "*one cause of the increase of rain which has*

been observed by all meteorologists since considerable clearings of the forests have taken place." Want of salubrity is not owing to the infinitesimal quantity of carbonic acid gas in the air we breathe, but to the presence of subtle miasma engendered by the decomposition of animal and vegetable substances, under the influence of heat and moisture. That forests oftener injure by preventing a free circulation of air, thus concentrating infection.

3d—That a series of authenticated observations, beginning with those recorded in the Calendar written by Columella in the first century of the present era, comparing it with that of the Arab Harib 960 years later, with that of Al-Clarkié in 1561, and with those of modern times, establishes the fact that Spain, formerly covered with forests and to-day cleared off, has not changed in climate perceptibly in 1800 years.

Elsewhere the same gentleman states that climatic conditions have not changed at Strasburg on the Rhine, notwithstanding extensive clearings have been made for culture, in 66 years; the mean temperature has not varied the tenth of a degree, and the fall of water has rather increased than diminished. The same result as regards increase of rain-fall since the clearing of forests has been experienced in France. He therefore favors the planting of trees for timber only on lands upon which cereals or other crops cannot be profitably grown; but does not of course object to planting them for ornament, nor on the margin of streams or highways, or to break the direct force of winds, unless in too large bodies; but thinks the proper localities for forests are the mountains and the exhausted lands. I hope to present the argument entire in the next volume of Transactions.

And now, if I have succeeded in affording you, gentlemen, an idea of the magnitude, the completeness and the importance of the Exposition of 1867 in its relations to the interests of mankind; and if, in addition, some little information of a special character has been imparted, my aim in making this report has been attained. Thorough study of all the objects assembled would have been the work of more than one life-time diligently and laboriously spent.

In conclusion, I beg to tender my acknowledgements to the members of the former and present Executive Boards for their co-operation; to Gov. Oglesby, who entered into the preparatory work of exhibition, with an appreciation and hearty good will from the commencement; to Col. James H. Bowen, of Chicago,

who devoted himself to the interests of the State and country in connection with the Exposition, unreservedly from an early day; to W. W. Corbett, Esq., of Chicago, for much valuable assistance for several months at the Exposition; to Prof. Worthen, State Geologist; to the other State officers, and to each one of the contributors to the State collection; to T. L. Minier, Esq., of Lincoln, for his intelligent exertions in collecting and forwarding a considerable portion of the contribution; to Jonathan Clark, Esq., of Chicago, who superintended the erection of the buildings from this State on the Park; to the Agricultural and other press, and to the Illinois Central and other railroad companies of the State, for their many contributions and gratuitous favors.

I cannot forget the many courtesies extended to me by M. M. Tisserand, LeSage, Mille, Marquis d'Havrincourt, Aureliano, and other gentlemen composing the Jury, with whom I served.

To Mr. A. D. Hager, the State Geologist of Vermont, I am under special obligations for assistance in arranging our scientific collection.

Very respectfully and truly,

JOHN P. REYNOLDS.

A P P E N D I X.

CATALOGUE OF AWARDS TO THE UNITED STATES.

CROSS OF CHEVALIER OF THE LEGION OF HONOR.

1. *McCormick, C. H.*, Chicago, Illinois. See Nos. 11 and 18.
2. *Wood, Walter A.*, Hoosick Falls, New York. See Nos. 12 and 29.
3. *Chickering & Son*, New York. See No. 13.
4. *Howe, Elias, Jr.*, ————. See No. 17.

NEW ORDER OF RECOMPENSES,

For persons, establishments, or localities, which, by organizations or special institutions, have developed harmony among co-operators, and produced, in an eminent degree, the material, moral and intellectual well-being of the workmen.

5. *Chapin, ———*, Lawrence, Massachusetts; Grand Prize, a gold medal of the value of 1,000 francs, and 9,000 francs in gold.
6. Agricultural Society of Vineland, New Jersey; an Honorable Mention, unaccompanied by a medal.

FINE ARTS.

7. *Church, F. E.*, New York city; the artists' medal, with 500 francs in gold. Landscape paintings in oil.

GRAND PRIZES.

8. *Field, Cyrus W.*, an Anglo-American Transatlantic Telegraph Company; transatlantic cable.
9. United States Sanitary Commission; ambulances, materials, instruments, &c., for the relief of the wounded, used in the late war. See, also, Honorable Mention.
10. *Hughes, ———*, New York; printing telegraph.
11. *McCormick, C. H.*, Chicago, Illinois; reaping machines. To this grand prize, gained in the field trials of agricultural machines, was added, by the Emperor, the Cross of Chevalier of the Legion of Honor. See, also, Nos. 1 and 18.

GOLD MEDAL, WITH WORK OF ART.

12. *Wood, Walter A.*, Hoosick Falls, New York; mowing machines. To this prize, gained in the field trials of agricultural machines, was added, by the Emperor, the Cross of Chevalier of the Legion of Honor. See Nos. 2 and 29.

GOLD MEDALS.

13. *Chickering & Son*, New York and Boston; pianos. To this gold medal was added, by the Emperor, the Cross of Chevalier of the Legion of Honor. See No. 3.
14. *Corliss Steam Engine Company*, Providence, Rhode Island; the Corliss engine.
15. Fire-arm Manufacturing Industry of the United States; fire-arms. See, also, Nos. 96 and 123.
16. *Grant Locomotive Works*, Patterson, N. J.; locomotive and tender.
17. *Howe, Elias, Jr.*, "promoter of the sewing machine." To this gold medal was added, by the Emperor, the Cross of Chevalier of the Legion of Honor. See No. 4.
18. *McCormick, C. H.*, Chicago, Illinois; reaping and mowing machines. According to the rule of the Imperial Commission this medal is absorbed in No. 11. See, also, No. 1.
19. *Meyer, Victor*, Parish of Concordia, Louisiana; short staple cotton.
20. *Rodgers, C. B. & Co.*, Norwich, Connecticut; wood-working machines.
21. *Sellers, William & Co.*, Philadelphia; machine tools.
22. *Steinway & Son*, New York city; pianos.
23. *Trager, L.*, Blackhawk Point, Louisiana; short staple cotton.
24. *Walbridge, Wells D.*, New York city; gold and silver ores from Idaho.
25. *Welch, Patrick*, New York city; type-dressing machine.
26. *Wheeler & Wilson*, New York city; sewing and button-hole machines.
27. *White, S. S.*, Philadelphia; artificial teeth and dentists' instruments and furniture.
28. *Whitney, J. P.*, Boston, Massachusetts; silver ores from Colorado.
29. *Wood, Walter A.*, Hoosick Falls, New York; reaping and mowing machines. See, also, Nos. 2 and 15.

SILVER MEDALS.

30. Alabama, State of; short staple cotton. See Honorable Mention.
31. American Button-hole Company, Philadelphia; sewing and button-hole machines.
32. Baker, W. & Co., Dorchester, Massachusetts; chocolates.
33. Barnes, Surgeon General J. K., United States army, Washington; surgical instruments, hospital apparatus, etc.
34. Bement & Dougherty, Philadelphia; machine tools.
35. Bergner, Theodore, Philadelphia; co-operator—engineer of Messrs. Sellers & Co.
36. Bidwell, J. C., Pittsburg, Pennsylvania; Comstock's rotary spader.
37. Bigelow, H., Boston, Massachusetts; copper and minerals from Lake Superior.
38. Blake, Wm. P., San Francisco, California; California minerals.
39. Bond, William & Son, Boston, Massachusetts; astronomical clock and chronograph.
40. Brown, J. K., & Sharpe, Providence, Rhode Island; screw-cutting and milling machines.
41. Burt, E. C., New York city; machine sewed boots and shoes.
42. California, State of; cereals.
43. Cape, Culver & Co., New York city; hams.
44. Chapin & Wells, Chicago, Illinois; model of a swing bridge.
45. CHICAGO BOARD OF PUBLIC WORKS, Chicago, Illinois; design of the lake tunnel.
46. Clark Thread Company, Newark, New Jersey; cotton yarns.
47. Collins & Co., New York city; steel ploughs.
48. Cool, Ferguson & Co., Glen's Falls, New York; barrel machines.
49. Colt's Patent Fire-arms Manufacturing Company, Hartford, Connecticut; fire-arms.
50. Crompton, G., Worcester, Massachusetts; loom for cloths.
51. CULBERTSON, BLAIR & CO., Chicago, Illinois; salted meats.
52. Daboll, C. L., New London, Connecticut; fog-signal.
53. D'Aligny, H. F. Q., co-operator in the organization of the United States section.
54. Darling, Browne & Sharpe, Bangor, Maine; steel measures.
55. Deloit, A., & Co., New Orleans, Louisiana; snuff.
56. Dixon J. & Co., Jersey City, New Jersey; plumbago crucibles.
57. Douglass Axe Manufacturing Company, Boston, Massachusetts; edge tools.
58. DUFFIELD, CHARLES, Chicago, Illinois; hams.
59. Fairbanks, E. & T., & Co., St. Johnsbury, Vermont; scales. See, also, No 127.
60. Florence Sewing Machine Company, New York city; sewing machines.
61. Fournier, S., New Orleans, Louisiana; electric clocks.
62. Glen Cove Starch Manufacturing Company, New York city; "mazena" and starch.
63. Gouthiel, Edward, New Orleans, Louisiana; co-operator, services rendered to agriculture in Louisiana.
64. Gregg, Isaac, Philadelphia; brick-making machine. See, also, No. 133.
65. Gunther, C. G., & Son, New York city; furs.
66. Hall, J., & Son, Boston, Massachusetts; buggy.
67. Howe Machine Company, New York city; sewing machines.
68. Howe, Dr. S. G., Boston, Massachusetts; works for the blind.
69. ILLINOIS CENTRAL RAILROAD COMPANY, Chicago, Illinois; agricultural products.
70. ILLINOIS, STATE OF; collection of minerals.
71. ILLINOIS, STATE OF; farmer's house.
72. ILLINOIS, STATE OF; school-house. } See, also, No. 143.
73. Jackson, Dr., co-operator; discovery of emery.
74. Lamb, J. W., Rochester, New York; knitting machine.
75. Lawrence, E., Louisiana; sugars.
76. Mason & Hamlin, New York city; cabinet organs.
77. Nevada, State of; silver and copper ores.
78. New York Mills, New York; muslins.
79. Oppen, Morris, New York; loom for corsets.
80. Park Brothers & Co., Pittsburg, Pennsylvania; cast steel and edge tools.
81. Partridge Fork Works, Leominster, Massachusetts; steel hay-forks, rakes, etc. See, also, No. 167.
82. Pease, F. S., Buffalo, New York; petroleum oils. See, also, Honorable Mention.
83. Perry, J. G., Kingston, Rhode Island; mowing machine. This prize was gained in the field trials of agricultural machines. See, also, No. 169.
84. Pigné, J. B., San Francisco, California; minerals.
85. Providence Tool Company, Providence Rhode Island; Peabody's patent fire-arms.
86. Remington, E., & Son, Ilion, New York; fire-arms.
87. Rutherford, L. M., New York city; astronomical photographs.
88. Schultze & Warker, New York city; mineral water apparatus.
89. SCHUTTLE, PETER, Chicago, Illinois; wagon.
90. Smith & Wesson, Springfield, Massachusetts; fire-arms and cartridges.
91. Spencer Repeating Rifle Company, Boston, Massachusetts; Spencer rifles.
92. Taft, J. B., Chester, Massachusetts; emery.
93. Tieman, G., Philadelphia; surgical instruments.
94. Tolles, R. F., Canastota, New York; microscopes.
95. Tucker, H., & Co., New York city; iron ornaments, imitation of bronze.
96. UNITED STATES GOVERNMENT; specimens of frame houses for settlers. See, also, Nos. 15 and 123.
97. Waies, William, Fort Lee, New Jersey; optical instruments.
98. Wardwell, G. L., New York city; stone-quarrying machine.
99. Washington Mills, Boston, Massachusetts; woolen fabrics. See, also, Honorable Mention.
100. Webster Woolen Mills, Webster, Massachusetts; woolen fabrics.
101. Weed Sewing Machine Company, New York city; sewing machines.
102. Whitney, B. D., Winchendon, Massachusetts; wood working machines.
103. Windsor Manufacturing Company, Windsor, Vermont; Ball's patent fire-arms.
104. Wood Brothers, New York city; phaeton.
105. Yale & Winn Manufacturing Company, Shelburne Falls, Massachusetts; Yale locks.

BRONZE MEDALS.

106. Abbey, C., & Sons, Philadelphia: dentists' gold foil.
107. American Lead Pencil Company, New York city; lead pencils.
108. Appleton, D., & Co., New York city; books.
109. Babcock, J. F., Boston, Massachusetts; rosin oil.
110. Baltimore and Cuba Smelting and Mining Company, Baltimore, Maryland; copper.
111. Barlow, Milton, Lexington, Kentucky; planetarium.
112. Bartram & Fenton Manufacturing Company, Danbury, Connecticut; sewing and button-hole machines.
113. Beer, Sigismund, New York city; stereoscopic views.
114. Belmont Oil Company, Philadelphia; oils.
115. Brigham, E. D., Treasurer Portage Lake Smelting Works, Boston, Massachusetts; Lake Superior copper.
116. Brown & Level, New York city; disengaging tackle for boats.
117. Carpenter, W. S., New York city; collection of corn.
118. Carroll, J. W., Lynchburg, Virginia; smoking tobacco.
119. Cummings, W., & Son, Jersey City, New Jersey; model of a hospital car.
120. Day, A. G., Seymour, Connecticut; indelible pencils and lead pencils in India-rubber cases. See, also, Honorable Mention.
121. DEERE & CO., Moline, Illinois; steel ploughs.
122. Degener & Weiler, New York city; printing presses.
123. Department of Agriculture, Washington; collection of cereals. See, also, Nos. 15 and 24.
124. Diss Debar, J. H., Commissioner of West Virginia, Parkersburg, West Virginia; petroleum oils.
125. Douglass Manufacturing Company, New York city; edge tools.
126. Douglass, W. & B., Middletown, Connecticut; pumps.
127. Fairbanks, E. & T., & Co., St. Johnsbury, Vermont; railroad scale. See, also, No. 59.
128. Fairchild, L. W., New York city; gold pens and cases.
129. Germfinder, George, New York city; stringed instruments.
130. Goddard, C. L., New York city; mestizo burying picker.
131. Gonderough Horseshoe Company, New York city; horseshoes. See, also, Honorable Mention.
132. Gode, I. D. H., Antrim, New Hampshire; apple parer.
133. Gregg, Isaac, Philadelphia; model of a brick machine. See, also, No. 64.
134. Hadley Company, Holyoke, Massachusetts; sewing cotton.
135. Harris, D. L., Springfield, Massachusetts; engine lathe.
136. Haupt, Herman, Philadelphia; tunneling machine.
137. Herring, Fernal & Sherman, New York city; fire and burglar proof safes.
138. Hoglin & Gafflin, Dayton, Ohio; tobacco-cutting machine.
139. Hotchkiss, H. G., Lyon, New York; oils of peppermint, etc.
140. Hotchkiss, L. B., Phelps, New York; oils of peppermint, etc.
141. Houghton, H. O., & Co., Cambridge, Massachusetts; books.
142. House, Henry A., New York city; co-operator in the establishment of Wheeler & Wilson.
143. House, James A., New York city; co-operator establishment of Wheeler & Wilson.
144. Howe, A. B., New York city; sewing machines.
145. Howe Scale Company, Brandon, Vermont; scales.
146. Hudson, E. D., New York city; artificial limbs.
147. Humphres, J. C., parish of Rapides, Louisiana; short staple cotton.
148. ILLINOIS, STATE OF; cereals and flours. See Nos. 70, 71, 72.
149. Jessup & Moore, Philadelphia; papers.
150. Johnson, A. J., New York city; Johnson's Family Atlas.
151. Johnson, B., Louisiana; sugars.
152. Johnson & Lund, Philadelphia; artificial teeth.
153. Justice, P. S., Philadelphia; power hammer.
154. Kansas, State of; collection of cereals.
155. Lilienthal, C. H., New York city; snuff and tobacco.
156. Lilienthal, Ch., New Orleans, Louisiana; photographic views.
157. Louisiana, State of; portable cottage.
158. Lyon, J. B. & Co., Pittsburg, Pennsylvania; pressed glass ware.
159. Merriam, G. & C., Springfield, Massachusetts; Webster's Illustrated Dictionary.
160. Mission Woolen Mills, San Francisco, California; woolen fabrics.
161. Moody, S. N., New Orleans, Louisiana; shirts.
162. Morris, Tasker & Co., Philadelphia; wringing machine.
163. Mumford, Foster & Co., Detroit, Michigan; boot trees, lasts, etc.
164. Murphy's W. F. Sons, Philadelphia; blank books.
165. Ohio, State of; collection of cereals.
166. Ohlstead, L. H., Stamford, Connecticut; friction clutch pulley. See, also, Honorable Mention.
167. Partridge Fork Works, Leominster, Massachusetts; agricultural hand tools. See, also, No. 81.
168. Pennsylvania, State of; anthracite coal.
169. Perry, J. G., Kingston, Rhode Island; mowing machine. See, also, No. 83.
170. Pickering & Davis, New York city; engine governors.
171. Pratt & Wentworth, Boston, Massachusetts; heating apparatus.
172. Randall, S. H., New York city; mica.
173. Reidel, G. A., Philadelphia; automatic boiler feeder.
174. Richards, Richard, Racine, Wisconsin; wool.
175. Roots, J. B., New York city; steam engine.
176. Roots, P. H. & F. M., Connersville, Indiana; rotary blower.
177. Sachs, F. & Sons, Philadelphia; shirts.
178. Sarrazin, J. R., New Orleans, Louisiana; tobacco.
179. Schedler, Joseph, Hudson City, New Jersey; terrestrial globes.

180. Schreiber, Louis, New York city; brass instruments.
181. Seecombe Manufacturing Company, New York city; ribbon hand stamps.
182. Shaw, C. A., Biddeford, Maine; knitting machine.
183. Shaw, Philander, Boston, Massachusetts; hot-air engine.
184. Slater, S., & Son, Webster, Massachusetts; cotton fabrics.
185. Smith, McPherson & McDonald, New York city; ales and porter.
186. Southern Cotton-gin Company, Bridgewater, Massachusetts; cotton-gin.
187. Squire, J. J., New London, Connecticut; preserved fruits and vegetables.
188. Stursberg, H., New York city; leather cloths.
189. Sweet, J. E., Syracuse, New York; composing machine.
190. Tambouy, A., parish of St. James, Louisiana; tobacco.
191. Tiffany & Co., New York city; silver ware.
192. Townsend, W. H., New York city; oil-cloths.
193. Union Button-hole and Embroidery Company, Boston, Massachusetts; button-hole machine.
194. Van Deusen, J. B., New York city; model of the yacht Fleetwing.
195. Warner, G. F. & Co., New Haven, Connecticut; malleable iron castings.
196. Watkins, C. E., San Francisco, California; photographs—landscapes.
197. Wickersham Nail Company, Boston, Massachusetts; nail-cutting machine.
198. Williams, T. C., & Co., Danville, Virginia; chewing and smoking tobaccos.
199. Wisconsin State Agricultural Society; agricultural products.
200. Wisconsin, State of; collection of minerals.
201. Wisconsin, State of; collection of cereals and flours.
202. Wright, R. & G. A., Philadelphia; perfumery.

HONORABLE MENTIONS.

- Alabama; short staple cotton. See No. 80.
- Allen, J., & Son, New York city; artificial teeth.
- American Steam Gauge Company, Boston, Massachusetts; steam gauges.
- American Wine Company, St. Louis, Missouri; sparkling wines.
- Aideews, W. D., & Brother, New York city; oscillating steam engine.
- Avery, D. D., Petite Anse, Louisiana; rock salt.
- Bacon, S. T., Boston, Massachusetts; cracker machinery.
- Baker, G. R., St. Louis, dough-kneading machine.
- Bates, R., Philadelphia; instruments to cure stitching.
- Beil Factory, Huntsville, Alabama; cotton fabrics.
- Buena Vista Viticultural Society, San Francisco, California; sparkling Sauterne wine.
- Bo den, Gail, New York city; extract of beef.
- Bottler, Charles, Cincinnati, Ohio; sparkling Catawba wine.
- Broughton & Moore, New York city; oilers, cocks, etc.
- Bourgeois, E., New Orleans, Louisiana; tobacco.
- Brandon Kaolin and Paint Company, Brandon, Vermont; specimens of paints.
- Bay & Hays, Boston, Massachusetts; preserved lobster.
- Brown, D. J., Roxbury, Massachusetts; enameled leather.
- Chipman, G. W., & Co., Boston, Massachusetts; carpet lining.
- Clark Steam and Fire Regulator Company, New York city; steam and fire regulators.
- Cohn, M., New York city; erminoline.
- Cozzens, F. S., New York city; cigars.
- Dart, H. C., & Co., New York city; rotary steam engine.
- Davidson, G., Washington; sextant.
- Davidson, J., St. Bernard parish, Louisiana; sugars.
- D. y., A. G., Seymour, Connecticut; artificial India-rubber. See, also, No. 120.
- Duffy, I., Patterson, New Jersey; design for improvements in iron-clad vessels.
- Dwight, G., Jr., & Co., Springfield, Massachusetts; steam pump.
- Edson, W., Boston, Massachusetts; hygroscopic.
- Elsberg, Dr. Louis, New York city; specimens of peat fuel.
- Empire Sewing Machine Company, New York city; sewing machines.
- Fries, Alexander, Cincinnati, Ohio; flavoring extracts.
- Glass, Peter Barton, Wisconsin; mosaic tables.
- Goodeough Horseshoe Company, New York city; horseshoes. See, also, No. 121.
- Gould, I. D., Boston, Massachusetts; mica.
- Herring, S. C., New York city; Ballard's hay-tedder.
- Hicks Engine Company, New York city; steam engine.
- Hirsch, J., Chicago, Illinois; albumen, glycerine, etc.
- Holliday, T. & C., New York city; aniline colors.
- Howard, D. B., New York city; ambulance etc.
- Howell, & Brother, Philadelphia; wall papers.
- Iowa, State of; collection of cereals.
- Jackson, J. H., New York city; minerals and fossils.
- Kaldenburg & Son, New York city; meerscham pipes.
- Korn, C., New York city; calf-skin leather.
- Lalanc & Grosjean, New York city; house-furnishing hardware.
- Linthicum, W. O., New York city; cloth clothing.
- Longworth, Cincinnati, Ohio; sparkling wines.
- McCormick, J. J., Meriden, Connecticut; skates.
- Marietta and Gale's Fork Petroleum Company, Marietta, Ohio; petroleum oil.
- Metropolitan Washing Machine Company, New York city; clothes wringers.
- Metropolitan Washing Machine Company, New York city; washing machines.
- Minnesota, State of; collection of cereals.
- Moehring, H. G., agent of the Volcanic Oil Company of West Virginia, Philadelphia; volcanic lubricating oil.
- Montague & Carlos, New Orleans, Louisiana; black moss for upholsterers.

Tasker & Co., Philadelphia; pipe-cutting machine.
 New Haven Clock Company, New Haven, Connecticut; clocks.
 Olmstead, L. H., Stamford, Connecticut; machine tools. See, also, No. 166.
 Oneida Community, Oneida, New York; preserved fruits.
 Page, E. W., New York city; oars.
 Paul, J. F., & Co., Boston; specimens of wood.
 Pease, F. S., Buffalo, New York; pneumatic pump. See, also, No. 82.
 Perrot, T. Morris, Philadelphia; medicine wagon.
 Pleasant Valley Wine Company, Hammondsport, New York; wines and brandy.
 Portland Packing Company, Portland, Maine; preserved lobster and vegetables.
 Prentice, J., New York city; cigar machine.
 Purrington, G., Jr., New York city; carpet sweeper.
 Robinson, J. A., New York city; Ericsson hot-air engine.
 Sabatier, G., Plaquemines parish, Louisiana; sugars.
 Selphe, W., & Son, New York city; artificial limbs.
 Sheldon, Joseph, New Haven, Connecticut; water pressure regulator.
 Smith, R. M., Baltimore, Maryland; petroleum oils.
 Steam Siphon Company, New York city; steam siphon pump.
 Stephenson, J., New York city; street railway carriage.
 Stockton, Samuel, Philadelphia; artificial teeth.
 Tallman & Collins, Janesville, Wisconsin; perfumery.
 Taylor, C. F., New York city; therapeutic apparatus.
 Tilden, Howard, Boston; sifter, tobacco-cutter, and egg-beater.
 Townsend Brothers, New York city; preserved fruits and oysters.
 United States Sanitary Commission; camp material. See, also, No. 9.
 Waltmeyer, Jacob, Baltimore, Maryland; preserved fruits.
 Ward, J., & Co., New York city; clothes wringer.
 Ward, J., & Co., New York city; washing machines.
 Washington Mills, Boston; shawls. See, also, No. 99.
 Wellman, C., New York city; saddles.
 Werk, M., & Son, Cincinnati, Ohio; sparkling wines.
 Wharton, Joseph, Philadelphia; nickel, cobalt and zinc.
 Willard & Co., New York city; photographic camera tubes and lenses.
 Williams, C. C., New York city; fruits preserved in syrup.
 Williams Silk Manufacturing Company, New York city; silk twist for sewing machines.
 Winslow, J. B., New York city; wood-moulding machine.
 Young, Isaac, commissioner for Kansas, Leavenworth, Kansas; specimens of wood.
 Zallée, J. C., St. Louis, Missouri; clothing.

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ERRATA.

Page 6, line 14 from bottom, insert "Northern" before "Continental."

Page 13, line 16 from top, for "Eastern" read "Western."

Page 70, line 6 from top, for "3" read "4."

For "LaMotte-Beauvron" read "LaMotte-Beuvron" wherever it occurs.

169 3280 (320
485
330 1280

100 acres & I have
 divided into four pieces of 40
 each costs at 50¢ the
 rod - for fence - \$640 -

100 acres at 50¢ ————— \$5,000.00

Taxes at 1 per cent 80
 Repairs of fence 1 per 80
 Interest per cent at 6 ————— 480
 640 -

Rent per acre \$6 ————— 760
 760 -

Income above ~~costs~~
~~taxes~~ on interest net
 Repairs fence
 Income about interest on
 interest net repairs and
 taxes —————

40 Cattle yearly 200 per
 and 500 per rod at
 4¢ ————— 52,000

Labor and food one
 man & team & 50 per
 month for 12 months 600 —————

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