Power Census of the United States*

Ninety Per Cent of the Total Power Produced by the Consumers Themselves

By Davis H. Tuck

In 1909, it is reported in the thirteenth United States census, 18,760,686 primary horse-power was generated or rented by manufacturing establishments in the United States. Table 2 shows the distribution.

Ninety per cent of the horse-power in 1909 was that of engines or motors owned by the manufacturing establishments themselves, and 10 per cent was rented power, mostly electric. Especially striking is the increased use

facturing industries in 1909. The relative total amount used is largely dependent upon the character of the industries predominant in each division or state, and the extent to which the different kinds are used depends upon the character of the industries and the situation of each State as to supplies of coal, petroleum and gas and the availability of water power.

In every State except Maine and Vermont, steam

purchased current) are reported from the Middle Atlantic, the East North Central and New England divisions.

The leading individual States using gas engines to develop power are Pennsylvania, Indiana, Ohio, New York, Illinois, Kansas and New Jersey. In the use of waterwheels to develop power the States are New York, Massachusetts, Wisconsin, New Hampshire, Vermont, Connecticut, Minnesota, Pennsylvania, Oregon, Virginia, North Carolina and Michigan.

In the absolute amount of electric power for manufacturing, Pennsylvania leads, followed by New York, Ohio, Massachusetts, Illinois, Indiana and New Jersey.

Green Vegetables and Their Uses in the Diet

It used to be said that a French housewife could feed her family upon what an American family would throw into their garbage barrel. This is probably no longer true. Though the abundance of food-products in the United States, and inveterate tradition, may still have the effect of keeping Americans somewhat behind the older populations in this matter of domestic economy, it is impossible to doubt that the influx of Germans, Italians and other new elements of population from Continental Europe has taught us the use as food of many vegetables and parts of vegetables which had formerly seemed useless.

In a bulletin on "Green Vegetables and their Uses in the Diet," Mr. C. F. Langworthy, Chief of Nutrition Investigations in the Department of Agriculture, has done much to spread information which ought to be helpful at this time, when the cost of living is a subject of incessant complaint. Even if much of the matter set forth in this bulletin is already familiar to the well-informed housewife, there are many who are by no means well-informed; and authoritative statements emanating from a Government bureau, and based upon careful experiments, should have some practical effect upon the dietary usage of the millions.

Mr. Langworthy's summing up is a plea for the increased use of succulent vegetables in American diets. This increased use, he predicts, will come with improved methods of production and transportation. It is not claimed, of course, that green vegetables add much to the nutrient and fuel values of food; but quite as important as these actual values is the hygienic effect which these vegetables produce in three ways: the supply of necessary mineral matter; added bulk, which is necessary for the proper digestion of the more concentrated food materials; and variety, which is so necessary for the maintenance of healthy appetite. "The great number of fancy foods, pies, cakes, and so on, which American housewives so often consider necessary, are often referred to as showing their ingenuity in providing variety from a few staple materials. They can get much greater variety without anything like as much labor by utilizing such fruits and vegetables as those discussed in this article.

To go back to the beginning of the bulletin, we are told that okra, a native African vegetable, has been cultivated for now more than a thousand years, and that rhubarb was introduced into Europe as early as the tenth century. On the other hand potatoes—as everyone knows—and Indian corn are the agricultural gifts to civilization of the aboriginal Red Man. Tomatoes are one of the newest foodstuffs in existence, having been, in their undeveloped form, regarded as merely ornamental until within the last two generations. It is comforting to see the bugaboo of cancer, as a result of eating tomatoes, disposed of as "without foundation" on the authority of this Government bulletin.

Among the most recent additions to the list of edible green vegetables given here are New Zealand spinach, udo and dasheen. The introduction of new varieties is part of the work of the Department of Agriculture, but there appears to be no provision for teaching American cooks how to use as additions to ordinary diet such easily obtainable things as the leaves of the grape vine. These leaves are used in Turkey in the preparation of several dishes, one being a sort of forcement balls which are a characteristic of wedding banquets. Another exotic addition here suggested is the nasturtium flower, though nothing is said of the use of the nasturtium seed vessel, which makes an excellent pickle in some countries. From the Chinese we may hope some day to learn the merits of bamboo shoots as food, canned bamboo shoots being already "not uncommon in American cities and towns where Chinese foods are on sale."

Of all families of human-food plants the crucifers are perhaps the most largely represented—cabbage, kale, cauliflower, mustard belong in this group. The family

TABLE 1

Division and State	Total horse-power (excluding duplication)	Owned by Establishments Reporting					Rented		Electric Motors	
		Steam engines	Gas engines	Water wheels	Water motors	Other	Electric motors	Other	Total	Run by current generated by establishment
United States	18,680,776	14,202,137	754,083	1,807,144	15,449	29,293	1,749,031	123,639	4,817,140	3,068,109
Geographic divisions:										
New England:										
Maine	2,715,121	1,656,911	44,451	751,270	3,412	2,055	218,642	38,380	663,143	444,501
New Hampshire	5,531,502	4,151,662	274,274	485,541	3,947	11,736	568,725	54,619	1,737,226	1,168,513
Middle Atlantic	4,382,070	3,491,418	283,450	206,393	2,048	4,766	375,876	18,119	1,297,447	921,571
East North Central	1,101,990	838,988	57,434	82,791	3,539	939	115,002	3,297	266,534	151,532
West North Central	1,837,401	1,434,221	36,688	184,431	1,082	5,321	171,146	4,512	343,393	172,247
South Atlantic	1,036,560	953,511	12,270	29,040	275	1,690	38,580	1,194	108,409	69,829
East South Central	873,350	805,640	29,291	3,060	48	2,513	31,807	991	78,393	47,086
West South Central	400,766	306,786	4,188	21,345	198	224	66,956	1,069	113,984	47,028
Mountain	802,016	563,000	12,037	62,273	900	49	162,299	1,458	208,101	45,802
Pacific										
New England:										
Maine	459,599	168,595	6,583	253,830	1,912	179	27,203	1,297	54,266	27,063
New Hampshire	293,991	139,128	1,238	127,490	521	30	21,209	4,375	45,351	24,142
Vermont	159,445	64,252	2,160	78,881	181	415	12,917	639	21,232	8,316
Massachusetts	1,175,071	834,701	18,326	185,096	520	895	109,996	24,637	402,492	292,496
Rhode Island	226,740	175,293	3,300	31,376	41	39	13,697	2,994	42,130	28,433
Connecticut	400,275	274,942	12,844	73,697	237	497	33,620	4,438	97,671	64,051
Middle Atlantic:										
New York	1,997,662	1,080,877	99,899	394,221	1,397	3,583	389,945	27,740	689,976	300,031
New Jersey	612,293	529,668	20,867	18,558	1,118	180	33,157	8,749	182,478	49,318
Pennsylvania	2,921,547	2,541,117	153,508	53,762	1,432	7,973	145,621	18,134	864,785	719,164
East North Central:										
Ohio	1,583,155	1,362,134	103,801	15,777	330	1,586	93,592	5,935	417,844	324,252
Indiana	633,377	448,528	109,105	7,446	447	599	65,548	1,704	233,193	167,645
Illinois	1,013,071	838,199	37,025	12,178	513	1,433	117,007	6,716	398,621	281,614
Michigan	598,288	465,520	13,988	41,442	577	16	74,270	2,475	133,026	58,794
Wisconsin	554,179	377,037	19,531	128,550	181	1,132	28,459	1,289	114,725	89,266
West North Central:										
Minnesota	297,670	199,777	7,174	56,631	2,939	25	30,297	827	52,212	21,915
Iowa	155,384	121,882	8,025	6,326	85	147	18,463	456	40,736	22,273
Missouri	340,467	280,489	11,159	3,532	206	5	44,056	1,020	106,941	62,885
North Dakota	13,196	10,170	1,304	520	12	1	1,683	3	2,084	401
South Dakota	17,666	12,257	2,784	527	12	1	1,683	3	2,084	401
Nebraska	64,466	44,806	4,408	7,361	75	76	7,530	210	15,942	8,412
Kansas	213,141	169,607	22,580	7,484	222	686	11,809	753	46,921	35,112
South Atlantic:										
Delaware	52,779	42,266	766	5,183	12	1	4,502	50	17,910	13,408
Maryland	218,244	181,326	5,736	11,553	121	1,069	17,108	931	44,921	27,813
District of Columbia	16,563	12,169	1,073	775	33	43	2,433	70	4,527	2,094
Virginia	283,928	221,303	3,664	45,122	33	38	13,356	412	42,043	28,587
West Virginia	222,896	187,389	16,952	12,901	71	1	5,330	253	28,543	23,213
North Carolina	378,556	219,444	2,356	41,619	307	1,035	60,044	1,251	86,002	55,938
South Carolina	276,378	193,052	1,264	38,422	75	2,400	41,130	67,620	126,490	26,490
Georgia	298,241	240,264	3,380	28,288	460	536	23,890	1,423	44,264	20,374
Florida	89,811	84,508	1,497	168	3	200	3,353	87	7,563	4,210
East South Central:										
Kentucky	230,224	207,591	4,724	5,320	57	915	11,314	303	31,268	19,954
Tennessee	242,277	215,338	1,853	9,670	107	4	14,668	639	29,586	14,920
Alabama	357,837	328,275	4,616	13,512	111	73	10,104	187	39,928	29,824
Mississippi	206,222	202,307	1,077	239	39	3	2,496	65	7,627	5,131
West South Central:										
Arkansas	173,088	168,152	1,374	639	35	52	2,581	255	7,417	4,836
Louisiana	346,652	331,370	3,496	65	10	2,401	9,077	233	27,139	18,062
Oklahoma	71,139	56,643	8,676	470	2	1	5,281	67	7,887	2,606
Texas	282,471	249,475	15,745	1,886	1	60	14,868	436	36,450	21,582
Mountain:										
Montana	90,402	49,654	223	13,583	63	26,504	375	27,301	797	3,803
Idaho	42,804	35,529	242	2,403	4	4,606	20	8,409	287	1,341
Wyoming	7,628	6,467	182	456	9	514	101	35,944	20,070	1,341
Colorado	154,615	135,645	1,464	1,377	49	105	15,874	101	35,944	20,070
New Mexico	15,465	11,781	365	74	19	3,219	200	15,100	11,786	1,341
Arizona	39,140	34,193	1,285	2,926	71	100	10,592	48	15,402	4,810
Utah	42,947	28,984	226	397	2	2,307	325	6,441	4,134	1,341
Nevada	7,765	4,533	201	1	1	1	1	1	1	1
Pacific:										
Washington	297,897	257,230	1,494	7,842	223	19	30,951	138	43,615	12,664
Oregon	175,019	112,244	428	47,041	397	30	14,811	98	20,802	5,991
California	329,100	193,526	10,115	7,390	280	30	116,537	1,222	143,684	27,147

Includes the horsepower of motors run by rented current and also of those run by current generated by the establishment.

TABLE 2

Power	Number of Engines or Motors			Horsepower			Per Cent. Distribution of Horsepower		
	1909	1904	1899	1909	1904	1899	1909	1904	1899
Primary power, total	408,472	231,363	168,143	18,680,776	13,487,707	10,097,893	100.0	100.0	100.0
Owned:									
Steam	209,163	169,774	168,143	16,808,106	12,854,805	9,778,418	90.0	95.3	96.8
Gas	153,482	127,267	130,710	14,202,137	10,825,348	8,139,579	76.0	80.3	80.6
Water wheels	34,352	21,515	14,334	754,083	289,423	134,742	4.0	2.1	1.3
Water motors	20,126	19,595	23,099	1,807,144	1,641,949	1,454,112	9.7	12.2	14.4
Other	1,203	1,397	(¹)	15,449	5,931	(¹)	0.1	(¹)	(¹)
Rented:									
Electric	199,309	61,589	(¹)	1,872,670	632,902	319,475	10.0	4.7	3.2
Other	199,309	61,589	(¹)	1,749,031	441,589	182,562	9.4	3.3	1.8
Electric motors:									
Run by current generated by establishment	388,854	73,119	16,891	4,817,140	1,592,475	492,936	100.0	100.0	100.0
Run by rented power	189,545	73,119	16,891	3,068,109	1,150,886	310,374	63.7	72.3	63.0
Total	199,309	(¹)	(¹)	1,749,031	441,589	182,562	36.3	27.7	37.0

¹ Not reported.

² Less than one-tenth of 1 per cent.

of gas engines and of electric power, both that rented from outside concerns and that generated by the manufacturers. The total horse-power of electric motors in 1899, including those operated by purchased current and by current generated in the establishment, was 492,936; in 1909 it was 4,817,140, nearly ten times as great.

Renting electric power is rapidly becoming more common among small establishments, while there is a tendency for the large concerns to use electric motors for applying power which they themselves generate.

The largest amount of electric power is used by the steel works and rolling mills, the next largest being the foundries and machine shops. In the former the electric power is a little over one third of the total amount of primary power and in the latter nearly three fourths.

Table 1 shows, in geographic divisions, the amount of each of the several kinds of power used in manu-

* Reproduced from *Power*.

facturing industries in 1909. The relative total amount used is largely dependent upon the character of the industries predominant in each division or state, and the extent to which the different kinds are used depends upon the character of the industries and the situation of each State as to supplies of coal, petroleum and gas and the availability of water power.

In every State except Maine and Vermont, steam engines are the most important source of power. The proportion which gas-engine power represents of the total is larger in the East North Central division than in any other division, partly on account of the proximity of gas wells. The Middle Atlantic States rank next in the proportion of the total developed by gas engines.

For power obtained by waterwheels owned by the manufacturing establishments, New England ranks far ahead of the other divisions both in the absolute amount of power and in the proportion which water power represents of the total. More than two fifths derived from waterwheels owned by manufacturing establishments is found in New England, and more than one fourth of the power of the New England factories is derived from waterwheels. The Middle Atlantic division ranks next.

The largest absolute amounts of power of electric motors (including both those operated by current generated in the establishment and those operated by