dense them from a recent parliamentary paper which shows the extent of acreage, and the estimated average produce per acre, of the principal crops of the United Kingdom for 1886. The estimate is based on returns received from about 14,000 parishes.

The figures show that during the year, England produced a wheat-crop of 58,071,171 bushels, which shows the large falling-off of 15,950,077 bushels, or more than 21 per cent on the year 1885, at an estimated average in 1886 of 26.87 bushels an acre, against 31.51 bushels in the year before. The falling-off from the average yield of an acre appears in all the counties of England except four. For Wales the estimated total produce of wheat amounted to 1,501,075 bushels, at an average rate of 21.86 bushels an acre, being .33 of a bushel above the estimated normal average. For Scotland the total produce of wheat is shown to be 1,895,652 bushels, at an average rate of 33.77 an acre, which may be compared with an average of 34.33 in 1885. The year's average, though smaller than the previous year's, is larger by nearly a bushel than the ordinary average. The aggregate results for wheat in Great Britain thus amount to 61,467,898 bushels, as compared with 77,587,666 in the preceding year, while the acreage under wheat was 7.8 per cent below that of 1885. Ireland also shows a diminution in the production of wheat, the numbers of bushels being 1,879,987 as against 2,048,103, a decrease of 8.21 per cent.

Of barley, the United Kingdom produced 78,309,607 bushels, as against 85,721,632 in 1885, and this decrease of 8.65 per cent is shared by all parts of the kingdom. The return for oats is more favorable, as the production of the whole kingdom was 169,376,088 bushels, an increase of 5.57 per cent over 160,440,907 bushels, the yield of the preceding year. In this crop Wales is the only portion of the kingdom where there is a decrease, and that is very small.

The pulse-crops are again a partial failure in many counties, and the production of beans and peas shows unsatisfactory results when compared with the normal rate of yield. The numbers for the whole kingdom, however, show an advance on those of 1885, being, for beans, 10,307,187 bushels, an increase of 15 per cent; for peas, 5,855,382, an increase of 35 per cent.

Of the root-crops, potatoes show a decrease from 6,374,242 tons to 5,835,487, a falling-off of 8.45 per cent; and of this, Ireland bears more than her share, as the returns from that country fell off 16 per cent. Wales and Scotland, on the other hand, are a little above the average. Turnips show an improvement in all the four divisions of the kingdom, having risen from 24,062,608 tons to 33,957,415, which means an increase of over 41 per cent. Mangold, again, shows nearly as large an increase, from 5,969,523 tons to 7,788,811 tons, which is over 30 per cent.

The hay-crop from grass grown on permanent pasture-land is shown to exceed slightly the average yield an acre in Great Britain, the total produce amounting to 5,763,235 tons, while that from clover is at the normal average of 3,311,449 tons. the total produce of both descriptions thus showing an aggregate of 9,074,684 tons. Hops show a decided gain in the year, as the yield in 1886 was 776,144 hundredweight as against 509,170 hundredweight in 1885, or an increase of over 52 per cent.

The tables show, that, on comparing the figures for 1886 in Great Britain relating to the produce of the crops dealt with, mangold, hops, and hay are the only ones showing an increase on the estimated ordinary average yield. Corn and pulse crops, potatoes, and turnips all show a decrease on the average, though in some cases they are in advance of the previous year. The returns for Ireland show a decrease, on the average, of wheat, barley, beans, and potatoes, and an increase of oats, peas, turnips, mangold, and hay.

NATURAL GAS.

In a paper on the pressure and composition of natural gas, read before the Engineers' club of Philadelphia, Dr. H. M. Chance stated that there are no records of the gas-pressure first shown by the larger wells The recorded pressures were nearly all observed after the gas had been blowing off for some weeks, months, or even years; and the pressure then shown by a gauge is evidently no measure of the pressure under which the gas exists in the rock, for the gas soon becomes exhausted from the immediate vicinity of the well, which then draws its supply from a considerable distance, and perhaps through bands of rock of such texture — and perhaps even through the clay filling of crevices — that the pressure shown at the well may be only a fraction of the actual pressure.

Hence, while recorded pressures range from about 600 down to 200 pounds per square inch, there is every reason to believe that the actual pressures are perhaps from 500 to 1,000 pounds per square inch, or even in some cases much greater, but still being less than the maximum as limited by depth. This maximum is very much less than the pressure necessary to effect liquefaction, and the supposition that the gas exists as a liquid must therefore be abandoned.

One of the most interesting phenomena recently observed in natural gas is its variability. The analyses of Professor Sadtler, made some nine years

ago, showed that gas from wells located in districts not connected with each other was similar in composition, but that the percentages of the different gases present varied widely; and more recent analyses show that gas from wells in the same 'pool,' and even that from the same well, is subject to daily and even hourly variations in composition. When it was found that the calorific value of the fuel was subject to change from time to time, as shown by variations in temperature of the furnaces, and in the steam-pressure of boilers under which it was burnt, this was at first supposed to be due to differences in pressure; that is, in the quantity of gas delivered to the burners in the fire-box. Automatic pressure regulators were introduced, and the producing companies perfected a system by which the pressures were maintained at a nearly constant figure, yet the same variations were observed. The chemists then began to examine the gas, and soon found that it was extremely variable in composition. The following table shows the results of ten analyses of natural gas, the first four being made from gas taken from the same well at different times, and the others from the gas of different wells in different districts: —

	1	2	3	4	5	6	7	8	9	10
Carbonic acid (CO_2)	.80	.60	–	.40	.34	.35	.66	2.28	–	.30
Carbonic oxide (CO)	1.00	.80	.58	.40	trace	.26	trace	–	1.00	.60
Hydrogen (H)	20.02	26.16	29.03	35.92	6.10	4.79	13.50	22.50	9.64	14.45
Marsh gas (CH_4)	72.18	65.25	60.70	49.58	75.44	89.65	80.11	60.37	57.85	75.16
Ethane (C_2H_6)	3.60	5.50	7.92	12.30	18.12	4.39	5.72	6.80	5.20	4.80
Propane (C_3H_8)	–	–	–	–	trace	trace	–	–	–	–
Nitrogen (N)	–	–	–	–	–	–	–	7.32	22.41	2.89
Oxygen (O)	1.10	.80	.78	.80	–	–	–	.83	2.10	1.20
Illuminating hydrocarbons	.70	.80	.98	.60	–	.56	–	–	.80	.60
Ratio, C to H (weight)	2.72	2.59	2.64	2.59	3.08	3.00	2.88	2.70	2.91	2.84

SUPAN'S JOURNAL OF COMMERCIAL GEOGRAPHY.

THE latest supplement of *Petermann's Mittheilungen* forms the first number of a journal of commercial geography. Prof. A. Supan, the able editor of the *Mittheilungen*, intends to give in the new periodical at regular intervals a report on the agricultural and industrial produce and of the commerce of all continents successively. The present number contains a brief introduction and the report on America. The principal feature of the new journal is the use of the results obtained by statistical observations for geographical purposes. German geographers of late apply much of their time and work to studying the mutual relation between geographical phenomena and the history of mankind. We call to mind Ratzel's 'Anthropogeographie,' which gave rise to numerous discussions, and was an incentive to many researches of a similar kind. The new periodical belongs to this class of publications. Supan sets forth his plan in the introduction. He intends to give a collection of reliable data arranged from geographical points of view. Thus he hopes to give material that will be useful by its clearness, and will enable the student to investigate the history of commercial life. "Whoever intends to study the relation between man and nature," he says, "must not confine his researches to a brief period. I am convinced that the geography of civilization must be studied from an historical stand-point. Here is the place where geography and history will meet again; this is the way in which geography may become a practical science in the noblest sense of the word."

Supan arranges the statistical data contained in the report of the tenth census of the United States into four principal groups, and proves that the north-eastern states have largely an industrial population. In the central group industrial and agricultural population are almost of equal importance, while in the southern the agricultural one predominates. In the western states the influence of the mineral resources is characteristic. Supan's discussion of the agriculture of North America is accompanied by several maps which give a clear idea of the distribution of cultivated land and of the culture of wheat cotton, and tobacco. The tables are so arranged as to show the moving of the principal district of production from east to west which began between the years 1850 and 1860. In 1850 the maximum of production was found in the southern Atlantic states; in 1860 it had moved to the Mississippi-Ohio group. At the same time the minimum moved from the prairie states to the plateaus. The agriculture of the whole east shows a permanent decrease, the northern-central and the western states a permanent increase of their relative importance, while the southern states have remained stationary. The rapid increase of the importance of agriculture which prevailed in the Mississippi and Ohio group during the last thirty years has ceased,

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