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## Statistics of Agricultural Production

Author(s): P. G. Craigie

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## JOURNAL OF THE STATISTICAL SOCIETY,

MARCH, 1883.

## STATISTICS of AGRICULTURAL PRODUCTION.

By MAJOR P. G. CRAIGIE, *Secretary of the Central Chamber  
of Agriculture.*

[Read before the Statistical Society, 16th January, 1883. The PRESIDENT in  
the Chair.]

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NEVER in the memory of the present generation has so much interest and attention been directed to agricultural questions as at the present time. A prolonged series of disastrous seasons, acting in unwonted combination with reduced prices received by the cultivators of the soil for the deteriorated remnant of the produce, has over a large surface of the country rendered the business of the agriculturist a wholly unprofitable one. Widespread ruin to many individuals, heavy losses of agricultural capital, a largely diminished income to the classes directly concerned in the ownership or occupation of the land, and as a necessary result a material check to the prosperity of the nation, arising from the partial paralysis of a fundamental industry, have led nearly every man among us to ponder over the true meaning and possible lessons of the distressful fact which, for want of a better term, we call agricultural depression.

At such a crisis the statistical inquirer has not been idle. The columns of the ordinary newspapers of the day, the pages of our parliamentary literature, and the quarterly journals of this Society, have for the last year or two borne undoubted testimony to the general search after figures explanatory of the situation. It may

be asked, therefore, why do I recall the attention of the Society to a matter already dealt with by far abler hands, and why do I add what may seem yet another postscript to an oft-told tale? My answer is a simple one. The very multitude of the explanations offered, the varied nature of the statistics tendered us, and the widely diverse and sometimes conflicting character of the prescriptions offered, or at least consolations proposed to us, all conspire to invite more attention to a very old subject, and make me ask whether it may not be profitable for us to re-open a very old controversy; whether in fact we may not now succeed in obtaining, what has often been recommended in days of agricultural prosperity, a complete official record of our yearly fluctuating agricultural position. Could this be done, and could we agree on an accepted standard of normal agricultural production, we should be able alike in days of progress, and in times of disaster and retrogression, to measure with some certainty whether on the whole we are going forward or going back.

I do not forget that we stand to-day statistically in a vastly better position than we did twenty years ago. Not this Society only, but the country owes to our late President, Sir James Caird, and to those who worked with him in the cause of agricultural statistics, a debt of gratitude in procuring the collection by the State of the fundamental data for any agricultural inquiry. This we have in the annual volume now issued by the department represented by our present President. Information of the utmost value is here supplied, both as to the yearly acreage of our crops, and the numbers of our live stock on a given day and in certain given areas, coupled also in recent years with very opportune statistics of the growing volume of our food imports, presenting as these do a graphic picture of the failure of home produce to feed our population.

If the estimates and calculations as to the extent of our present agricultural disaster are even now somewhat contradictory what would have been the Babel of conjectures and explanations which would have perplexed and puzzled us, had statistically minded inquirers into agricultural depression in 1879 or 1882 no better charts to guide them than were possessed by the public before the institution of the Board of Trade Agricultural Returns in 1866? Guesses there were many at our probable acreage of corn crops before the facts were ascertained, but they were guesses at the best. Although the State did nothing in these days to help a solution, valuable unofficial efforts were no doubt made by means of more or less elaborate personal inquiries; and the labours of Mr. McCulloch and Mr. Caird deserve recognition for the remarkable approach of their estimates to the subsequently ascertained

facts. Still if we reflect on the double sources of error which must have arisen in any effort to discover our actual or relative production, when we should have had to employ a hypothetical basis of area as well as a hypothetical yield of crops, it must be apparent that a large and material step has been gained. Is it then not possible to take one step more, and gather in England information as to the produce of our soil as well as to the mode in which that soil is occupied?

I use the term "England" advisedly, for it must not be forgotten that in Ireland such an official record has long been annually compiled. It was disaster, I believe, that prompted the effort there. Perhaps the same result may follow disaster on this side of St. George's Channel. More than ten years also before official statistics of any sort were collected here, and while many English farmers were timidly resisting the very idea of inquiry, the Highland and Agricultural Society of Scotland, with the ready aid of practical agriculturists, gathered for the Board of Trade a valuable series of facts for some years in Scotland, embracing elaborate data as to the yield and character as well as the distribution of the several crops. Such data is forthcoming now in almost all civilised empires, and forms a recognised and useful branch of their domestic statistics. The Statistical Office of the United States Department of Agriculture gives ungrudgingly not merely annual but monthly reports, of the greatest value to their own community, and even to ourselves, since the agricultural growth of America is a matter in which Englishmen in these days, whether as farmers or as consumers, have a keen and immediate interest. If we turn to our continental neighbours, or to the records of our own colonies, we shall see that what the English public seem to think nothing of, and what the English agriculturist in too many instances, I fear, still regards as useless or objectionable, the natives of other lands deem vital and essential.

#### *The Royal Commission.*

Before inquiring how such data is got in other countries, or how it has been proposed we should get it here, I cannot but interpose an expression of regret that a recent most opportune occasion which presented itself has not been made full use of. The position and prospects of British agriculture has just been the subject of a long, laborious, and costly inquiry. This inquiry, I believe, was most properly undertaken. It is one from which, differing from some of my friends in this respect, I expect no small amount of ultimate good. But although three long years have been spent in this inquiry, we cannot help observing that the final report bears many traces of haste, possesses no very symmetrical

arrangement, and is certainly statistically defective and incomplete. Nevertheless this Commission has enriched the agricultural literature of the day with a library of valuable blue books, offering to the agricultural economist of the present, and the agricultural historian of the future, a perfect mine of information brought together from the voluminous evidence of an immense selection of experts of all classes, and the researches of able and indefatigable assistant commissioners, conducted within the United Kingdom itself, on the continent of Europe, and on that great western continent which throughout the present depression has been the occasion of so much alarm to the agricultural classes of England.

Vast as are the stores of information thus collected, and made available for all who have time and patience to win the treasure from the mine in which it lies buried, I cannot but think that the Commission has omitted one very important function which it might fairly have been expected to discharge. It has reported indeed in general terms as to the great causes, climatic and economic, of agricultural depression. Whilst acknowledging the narrow margin within which legislation can help the farmer, it has indeed shadowed out within this margin some ten or twelve specific legislative changes which the Commissioners rightly urge on the attention of Parliament at this crisis. But though the Commission briefly quotes to us the calculations as to actual losses laid before it by certain eminent authorities, or narrated by individual farmers, it has not itself made use of these data, or of the mass of individual evidence before it, to venture on any official estimate of the extent of the direct losses of agriculturists, or the consequent and indirect, but no less real, losses of the country as a whole. It has not availed itself of the machinery it possessed, and the important local inquiries it conducted, to give us a standard of the normal limits of British agricultural production, whereby we might measure what was in happier times the average yearly outturn of this vast industry, and in what specific particulars the earth has ceased to yield her accustomed increase. Surely the mass of evidence collected throughout England by the assistants of the Commission, or extracted from its witnesses, might have been made to yield a more fully developed crop of agricultural statistics, and especially of statistics of agricultural production, than have ever before been in the hands of the British public.

The failure of the most laborious inquiry ever made into British agriculture, embracing a specially conducted series of local inquiries by well qualified experts, to furnish what statisticians have long been asking for, is undoubtedly disappointing. I cannot but feel a good opportunity has been missed, and we are launched on a probable series of political discussions upon agricultural ques-

tions, without the aid of any authoritative and accepted estimates. While therefore we have estimates of various sorts volunteered as to sections of our own consumption of food, and of our agricultural produce, or even as to the aggregate outturn of British acres, we have no official ones, and I feel sure those who have in the dark directed their efforts to frame calculations, will be the first to acknowledge much remains to be done. I personally have little right to trouble you with such a question, but I think I am not wrong in claiming for the matter the serious consideration of this Society; and were authority needed to enforce the subject on our consideration, I would remind you of the wise councils of a late President, Mr. Newmarch, whose loss is still so keenly felt, who, in his address in 1869, urged on the younger members of the Statistical Society as the first of the fields of research requiring most early consideration, the aggregate consumption per head among different classes, and by the nation as a whole, of the chief articles of food, corn, butcher's meat, and other produce; and as the second, the annual production of our agriculture, adding, in words which I do not think at all inappropriate even now, "At present we cannot speak with any approach to accuracy of the extent and cost of the most vital of all requirements, the food of the people; we are perpetually guessing at the probable consumption of wheat and other grains per head, and the same of potatoes and butcher's meat."

By way then of urging others who have more ability and time to go more fully into the matter than I can pretend to do, I would ask leave to put, I fear somewhat crudely, before you what has been attempted in this country by unofficial efforts, what I have been able to glean from the occasional statistics compiled during the present inquiry by the assistants to the Duke of Richmond's Commission, and what is officially done abroad, while I will try to bring together, so far as may be, the various efforts of independent investigation both as to the details and the aggregate of our agricultural production.

#### *Early Attempts at Statistics.*

The curious vagueness of our English ideas as to the dimensions and the use of the soil we live on, a vagueness which still obtains far too much throughout the whole range of agricultural questions, was perhaps never more visible than when Mr. Pitt, in his estimate for his income tax assumed the acreage of England and Wales to be, as Arthur Young, mistakenly, imagined, a matter of close upon 47 million acres, when it was only some 37 millions.

Without going needlessly far back, I find in parliamentary records as early as 1827 an approach to closer agricultural statistics,

limited indeed to general figures, and representing acreage only, but perhaps worth reproduction, that we may contrast them with the official figures now available. This estimate of Mr. William Couling, as laid before a parliamentary committee on emigration, and by them printed in their report, would, if we are to attach any value to Mr. Couling's labours, endorse the impression that the extension of pasture and reduction of arable land in England, the feature we hear most of in agricultural statistics to-day, is but the reversal of a process begun at no remote period, and a return to an older state of matters.

Of course this estimate may have been founded on imperfect data, but we are told it was the result of personal researches conducted both between 1796 and 1816, and again in 1824-27, involving journeys of over 50,000 miles in 106 counties of the United Kingdom. Mr. Couling's table, which had special reference to that gentleman's estimate of the land which might be and yet was not under crops, may be given in thousands of acres as follows:—

	Arable and Garden Land.	Pasture and Meadow.	Wastes.		Total.
			Reclaimable.	Unre- claimable.	
England .....	10,253	15,379	3,454	3,256	32,362
Wales .....	891	2,226	530	1,105	4,752
Scotland .....	2,494	2,770	5,950	8,524	19,738
Great Britain .....	13,638	20,375	9,934	12,885	56,832
Ireland .....	5,389	6,736	4,900	2,417	19,442
Islands .....	110	276	166	569	1,119
United Kingdom .....	19,137	27,385	15,000	15,871	77,393

We need not be required to endorse Mr. Couling's sanguine estimate of 15 million acres of wastes capable of profitable reclamation. The course of agriculture in the fifty-six years since this table was drawn, first under protection and then under free trade, has never been such as to tempt sanguine speculators into the suggested addition of 33 per cent. to the "cultivated area" of the United Kingdom. I leave others to place what value they please on the figures here quoted, only calling attention to the proportion of grass to arable land, the latter forming less than 41 per cent. of the cultivated area seventy years ago against 47 per cent. now, while there is a close coincidence between the total of  $46\frac{1}{2}$  millions of cultivated land accounted for by Mr. Couling and the  $47\frac{1}{2}$  millions of Mr. Giffen's present statistics.

The attempt of the magistrates of Norfolk in 1831 to obtain agricultural statistics for their own county should be noticed as a

matter of history, if only for the fact that even in those days 429 persons, out of 680 applied to, returned the information sought. A later attempt made by the Board of Trade to obtain experimentally a set of agricultural statistics for the single county of Bedford, through the instrumentality of the clergy, failed, only 27 out of 126 parishes being accounted for; the data rendered, however, as may be seen from the tables printed at the time in the *Journal* of this Society, were in these cases very complete, and embrace as well as acreage, the gross produce and yield per acre of every crop, and the relative size of the farms, the class of soil, and even the prevailing mode of tenure.

Again, in 1845, in England, Scotland, and Ireland, a partial attempt was made. North Hampshire was the English place of experiment; Midlothian the Scottish; and Bailieborough Union, the Irish. The last, conducted by private agency, was entirely successful. The second was equally satisfactory, the agency of the parochial schoolmasters being employed. The English effort, by means of the boards of guardians, failed. Compulsory statistics were, one year after, projected by a Government Bill brought in by Mr. Milner Gibson, but like some later measures, not proceeded with. Ireland, however, warned by disaster, established her fairly complete series of agricultural statistics, which are still collected by the Registrar-General's Department, through the agency of the constabulary, who are aided in each district by the information of practical agriculturists. These official data alone, of those now collected in this country, contain also estimates of produce as well as statements of simple acreage. With praiseworthy energy the East of Berwickshire Farmers' Club in 1849 procured an agricultural census of that county, and achieved it with the expenditure of a single five pound note. In 1853 the Highland and Agricultural Society were permitted by the Board of Trade to make an experiment in three Scotch counties; and a second English experiment was made with the aid of the Poor Law Inspectors. The Scotch effort was again successful, only in three instances throughout the three counties was the information not rendered by the voluntary act of the occupiers.

The English experiment, especially in Norfolk, under the active superintendence of Sir John Walsham, showed that the original hostility of a certain section of the farmers was much mitigated, the failures in that county being only  $2\frac{3}{4}$  per cent. In Scotland produce as well as acreage was returned; and in 1854 the whole of Scotland was embraced in the Highland Society's scheme, the funds being provided by the Government. In Table A of the Appendix to this paper I reprint, in a condensed form, a specimen of the elaborate information given both as to produce and weight, matters



which go beyond the scope of our own efforts on this side of the Tweed. In eleven English counties statistics were attempted in the same year; but in this case there was a failure of the machinery employed to collect anything like as closely as in the North, though sufficient success was secured to lead the House of Lords' Committee of 1855 to report distinctly in favour of uniform and compulsory statistics, (1) of acreage, (2) of live stock, and (3) of estimated produce: the last returns to be for districts and not individual farms, and made up in the month of November only. The machinery suggested was that of the Poor Law officials. This mode, however, was objected to on various grounds, and the distaste for the proposed machinery impeded the earlier establishment of even acreage and live stock returns.

The work undertaken by the Highland and Agricultural Society was continued during the years 1854-57. At a time when it is proposed to extend the present official inquiries so far as to embrace, in accordance with the recommendation of the House of Lords' Committee of 1855, an estimate of the actual produce of the harvest, it is well to remember that the estimated produce formed a material portion of the Scotch figures. Nevertheless, such was the confidence of the Scottish agriculturists in the machinery employed, that, recognising the importance and utility of the work, the Scottish farmers readily and faithfully furnished the desired information—opposition being of extremely rare occurrence, not one-fifth of 1 per cent. of the schedules remaining unreturned or unaccounted for. Every county was divided into districts, and enumerators were appointed for each district, who in their turn were aided by committees composed of representatives for each parish; the averages being usually computed for parishes, a mean taken for the district, and a general one for the county. The entire statistical staff engaged under the energetic direction of Mr. Hall Maxwell, the secretary of the Society, exceeded 1,000 farmers, and the public spirit both of the Society and the farmers of the North was fully recognised by the Board of Trade.

The discontinuance of that system must therefore be seen with regret, the cause being the increasing requirements made by the Treasury respecting the minute details of the distribution of the grant, first of 6,000*l.* and afterwards of 4,000*l.* made to the Society, which were deemed incompatible with the generally voluntary character of the inquiry. The amicable relations at first subsisting between the Society and the Government did not in fact stand the strain of the doubtless orthodox remonstrances and disallowances of Treasury officials alarmed lest sufficient "vouchers and particulars" were not forthcoming for several items of expenditure, such as the shockingly indefinite outlay of 7*s.* 10*d.* for pens and pencils.

It may be hoped that the new Agricultural Department we expect to see speedily created, and to which we will look for largely developed statistics, may not find the Treasury, as I am afraid is often the case, a trifle too ready to spoil the ship rather than spend the proverbial ha'porth of tar. When we remember how much public money is distributed, surely some might with propriety be ungrudgingly devoted to the perfecting and extension of our own statistical system.

Mention should be made of the strong recommendation which the question of agricultural statistics received from more than one International Statistical Congress. In 1853, at Brussels, the question was prominent; and seven years later, when the Congress met in London, our national defects in this respect had to be confessed by the late Prince Consort, and resolutions, calling on every State to obtain statistics, both of the area and the produce of its crops, were adopted. In June, 1864, Sir James Caird, in spite of the opposition of the Government of the day, carried at last the resolution which led to the establishment of our present yearly returns. It is these returns which, in accordance with the views of the statisticians of all nations, and with the recommendations of our own parliamentary inquiry, I would urge should be now supplemented by the addition of a produce return. The experience of Ireland, of Scotland in 1854-57, and of most other countries, shows that there is no impossibility in this matter.

#### *Undue attention to Wheat Crop.*

Most of the inquiries made into the agricultural products of this country have stopped short at the produce of the wheat crop. This has been so from the crude guesses of our earlier calculators, to the elaborate experiments and valuable records which Sir John Lawes now lays year by year before the country. Wheat has, it must be confessed, always occupied a position of vantage more on account of its very direct and immediate relation to the food of man than of its bulk as an item in our agricultural production. Out of the 47 million acres of land returned as cultivated in the United Kingdom, only 3 millions, that is about one-sixteenth part, is devoted to the growth of this cereal, while the value of the crop, even at the time when wheat was still fetching, as is not now the case, a profitable price, was but from a tenth to an eighth of the aggregate outturn of our farms. On the produce of this crop, however, most of the inquiries which have been attempted were directed, and to far too great an extent we have been accustomed to measure the so-called "harvest" generally, and even the entire agricultural position, by the success or failure of the wheat crop alone. When it is remembered that

the proportions devoted to this cereal vary so enormously in different parts of the country, and reflect on the fact that though a bad harvest usually means loss on all our grain crops, it by no means follows that all suffer equally, I think I may be allowed to plead for greater prominence being allowed to the records of the yield of our other crops. In Ireland, it should be recollected, there is but one acre out of every hundred returned as under cultivation on which wheat is grown; in Scotland less than two acres in the hundred; in Wales, certainly not four. Even taking a ten years' average, and so avoiding laying too much stress on the comparative recent decline of wheat growing, there are several English counties where the percentage of wheat is equally small. In seven, at all events, the entire wheat area does not reach 7 per cent. of the cultivated surface; in sixteen counties not 10 per cent. of wheat land is recorded, while only in one-half of our counties is wheat produced on as much as an eighth of the area under crops of all sorts; in only eight counties does this cereal cover a sixth of that area, and I believe in one county alone—that of Cambridge—is anything like a fourth similarly employed.

The sister cereals of course have been allowed for on the rare occasions where exhaustive and careful calculations of our whole agricultural produce have been made. It is rather in the current and less scientific mention from year to year of what we are supposed to grow, and of how agriculture, as a whole, is progressing, that I cannot but think a far too exclusive attention is directed to wheat alone. In laying, therefore, in the tables in the Appendix to this paper, before this Society fairly complete records of the production of barley, oats, and other crops, as well as wheat, I hope I am at least providing material which may be usefully employed and continued by the statisticians of the future.

#### *Estimates of Yield of Crops.*

In attempting to contrast the estimates of yield made by various authorities, much more information is, however, ready to hand respecting wheat than any other grain, and the first and most complete comparative table of produce estimates must, perforce, deal solely with this crop.

In Table B it will be seen I have brought together a record of ten different estimates of the yield per acre of English wheat obtained in different ways, and county by county, at distinct intervals during more than one hundred years. From this it will be seen that in default of official data the voluntary efforts of private individuals, and the laudable endeavours after information of the newspaper press, have come to our aid. The results of the

inquiries in the case of barley and oats I have placed by themselves in Tables C and D respectively.

The first wheat estimate is Arthur Young's, in 1770, and is quoted in Sir James Caird's "English Agriculture in 1850-51." The second set of wheat yields are those given in Mr. McCulloch's work of 1837, but are themselves the reproduction of the data collected by the old Board of Agriculture in the early years of the present century. In the third case, I take Sir James Caird's own figures of 1850. In this case, and that first quoted, although the figures for certain counties are not forthcoming, we have peculiarly careful estimates made after prolonged and personal investigation; and their value is all the greater, since in each case they are the conclusions made on one uniform principle and by a single authority, and not an arithmetical mean of various differing statements. In all the later columns of the table the data is of the second class, and is the result of more or less complete inquiries at not very far distant periods. With the method adopted in all these instances I am perfectly familiar, and I know of course that in any such estimates considerable errors of some moment may from one cause or another creep in. There is, however, sufficient general harmony in the results to enable them to be quoted here, and no little advantage in bringing them, as I have been able to do, side by side, for your inspection and consideration. The first of this class to which I refer was undertaken in 1861 by the "Mark Lane Express" newspaper, which has on several occasions repeated a similarly useful and definite inquiry as to the yield expressed in bushels rather than the very vague reports sometimes tendered of the crop of the year, merely as being "under" or "over" average, and I believe the information given for 1861 represents the opinion of five hundred reporters. The next inquiry quoted was made in 1870 by the "Chamber of Agriculture Journal," with the object of ascertaining by a very extensive series of special reports, the normal or standard yield, not only in every county, but in every poor law union within that county: returns from as many as forty or fifty corn growers in many counties being obtained. The succeeding set of wheat yields is a double one. It comes before us with the more authoritative stamp of being based on information furnished to the Royal Commission on Agriculture which has just concluded its labours, by the four assistant commissioners, whose districts covered the whole of England and Wales. I have not been able in all cases to obtain records of yield collected by these gentlemen. The general practice adopted by the assistant commissioners was so far uniform, that questions as to the yield of farm crops over an average of years prior to 1878, and in the year of our most supreme disaster, 1879 itself, were included in the circulars issued in each

district. But the sufficiency of the replies received varied much in the several areas. Apparently, also judging from the scattered statistics embodied in or appended to the reports, the use made by the assistant commissioners of the information was different in different cases. After a careful search through the statements of Messrs. Little, Druce, Coleman, and Doyle, I took out under each county their published data as to yield, wherever the mention of the matter could be conveniently thrown into statistical form. Throughout the eastern, east midland, south-eastern, and south-western counties, on which Messrs. Druce and Little reported, I found on the whole a fairly representative series of crop yields, and indeed it whole have been well had the commissioners themselves worked out for the whole country similar statistical data as was supplied by Mr. Little for his own division. Both Mr. Little and Mr. Druce very kindly placed at my disposal a further supply of data from their notes beyond those taken account of in their published reports, and this extended the basis for a general average. In the north, while the great county of York has been pretty fairly represented in this matter in Mr. Coleman's reports, the other counties in the north and north-west furnish comparatively little information on which averages may be computed. This is still more the case in regard to the western and Welsh counties in Mr. Doyle's district, wherein the number of instances in which he quotes reported yields, especially for any *average* of years, is but few; and the insertion of special instances could not be justified, as I have no reason to suppose them typical. It must be understood therefore that I give these columns for what they are worth, as founded on data collected during the commissioners' inquiries, and though not of equal value in all cases, yet grouped and tabulated for the purpose of giving a general impression of each county's yield.

A review of these figures has necessarily been a somewhat laborious operation, and I cannot present the somewhat imperfect results of it before this Society, without repeating my regret that the valuable information thus collected by the assistant commissioners, not only from individual farms but from large estates, entire unions, or even counties, or sub-divisions of counties, either directly from the most intelligent agriculturists, or through the instrumentality of committees of the various chambers of agriculture or similar local bodies, was not analysed and tabulated on a more extended scale by the machinery of the commission itself. It is evident that had the commission allotted a larger share of their attention to the securing of data of this nature, a vastly greater amount of it might have been accumulated by its able and energetic officers, and an agricultural survey of greater value statis-

tically, even than that most interesting if less definite one which has been accomplished, might have been now in the possession of the public.

One more investigation I quote from the "Mark Lane Express" made in the present year. Although wanting full authority from the comparatively narrow basis of its reports—only two hundred and fifty-one reports being included in the tables—it possesses a distinctive character of its own, giving a special return from its correspondents of the average crops of the past seven years of agricultural depression. Although perhaps useful as evidencing the yield of a very abnormal period, care must be taken not to confuse these exceptional figures with the common term of an "average" crop, and I must be allowed to enter a protest against data so collected being treated as a normal standard of production. A special inquiry into the estimated produce of the year was also made at the same time, but this was before, or at the commencement of harvest, and was an estimate only. The seven years' figures, however, I quote for comparative purposes.

The last inquiry the results of which I compare with the others, is one which has only just been concluded, having been conducted by myself within the past month for one of our agricultural papers, the "Farmer and Chamber of Agriculture Journal." It also consists of two parts—an extensive investigation both by circular, and in very many cases by private application, to agriculturists of all classes, and to millers and corn traders in several instances as well, first into the actual yield of the last harvest, and then into the standard at which the persons rendering the reports in each case would estimate the average or normal yield over a twenty years' period ending with 1882. I am very conscious that even this inquiry is in several instances deficient. But I am convinced from the experience gained in this attempt, that with proper time and staff such an inquiry might be made of the highest value. As it is, it is the first experiment of so extensive a character for many years. Some of the persons applied to for information—all being men selected either by myself or by the many friends who rendered active help throughout our counties, as possessing the requisite knowledge of the crops of their several districts—were unable to furnish the data required; others communicated their views in an interesting but scarcely statistical form by letter. But I find that on the average over eight hundred of those addressed were able to tell me something of what I wanted to know, and over seven hundred and thirty have made reports of more or less value; and in only a trifling percentage of cases did the returns come too late for insertion, or have I been unable to tabulate the information thus sent, and employ it as the basis for the last two

columns of my table of comparative estimates of yields. Every county of England is represented in these latest returns with the exception of Rutland and Middlesex, the chief corn growing counties furnishing the largest proportion of the replies.

It may be worth mentioning that the eastern group of counties, where 30 per cent. of the corn area of Great Britain is found, supplied me with 35 per cent. of my whole number of returns. Another 24 per cent. of these returns was contributed from the south-eastern and east-midland counties, wherein lie rather more than 20 per cent. of the acres under corn. The proportion of the corn area which is embraced by the western and south-western counties is just 16 per cent., and 16 per cent. of my returns came from these counties; while the northern division of England, with  $12\frac{3}{4}$  per cent. of the corn, is represented by 12 per cent. of the tabulated reports.

North and South Wales are less fully, but still, I believe, adequately reported on. Scotland was also included in that inquiry, sending me some sixty separate reports; and I gratefully acknowledge the kind and courteous co-operation both of the Secretary of the Highland and Agricultural Society, and the Secretary of the Scottish Chamber of Agriculture, the former Secretary handing me lists of his own selected reporters on the Scotch crops, and the latter invoking the good offices of his directors and the conveners of the county committees of his organisation.

The Scotch part of the data collected I have tabulated separately in Table E in the Appendix, and placed alongside of it a specimen of the Highland Society's complete statistics of 1857, and a note for 1881 of those less formal but still valuable comparisons which the same Society still annually obtains about this period of the year.

I desire, however, also to call attention to an inquiry on a wholly different basis to any of the foregoing, viz., the several geological areas of England, which was made by the "Farmer" in 1867; but this, from its character, could not be combined with the others, and I have given its results separately in Tables F and G. Bearing in mind the bad character of the special harvest represented in this case, the data will be found interesting and instructive.

#### *Grouping of Areas for Produce Statistics.*

I ought here to explain the mode of tabulation I have adopted, as it will be seen, the counties in my tables do not follow in alphabetical order. In a paper I read to this Society rather less than three years ago, I suggested the subdivision of England into certain

groups of counties possessing both geographical contiguity and in the main similarity of agricultural features. My object on that occasion was limited to an investigation of the changes in the systems of culture exhibited in a ten years' survey by the figures of our yearly blue book of agricultural returns. It was sufficient then for my purpose to divide England into three belts or zones. I placed in the easternmost division five counties as peculiarly and exceptionally devoted to the growth of corn, and having very nearly two acres out of every three under the plough in 1879. A second area I traced on the map by an irregular line tending southward from the centre of the Yorkshire coast to that of Dorset. This embraced, of course, a much larger area lying to the north, west, and south of the group already referred to, and one which possessed a mean of just over one acre out of every two of arable land. All England to the north and west of this central area I regarded, with but little difference of detail from the familiar classification of our yearly blue book itself, as the peculiarly grass district, its arable land not forming more than one-third of its superficial area.

This rough classification sufficed for the purpose I had then in view. For the purpose of estimating and recording the yield of our crops, and especially of our corn crops, it seems to me we want a closer subdivision of the country, yet one containing larger groups than merely county areas. These are too small and too unequal as units to tell quite fairly what we want to know, and we want a sort of provincial subdivision of, roughly speaking, somewhat uniform area, within which to localise our estimates of production. I allude especially to the corn crops as the leading feature which should guide us in any subdivision, because it is only corn the production of which can be, properly speaking, localised at all. Meat production, to which our own hay and grass crops mainly are directed, cannot be set down to the credit of certain areas; the accident of cattle especially being found in one county or another on the day of the yearly census, tells us nothing of the spot whence they will ultimately go to the butcher. The manufacture of meat is conducted, it may be, partly in one area and partly in another, and the roots of one county contribute equally with the grass of another to the building up of the animal products of our farms, while many foreign countries send a share of their produce to provide us with feeding stuffs for fattening stock.

A recent grouping of our English counties has been suggested by Mr. W. C. Little, one of the assistant commissioners to the Royal Commission on Agricultural Depression. In a series of letters, full of most valuable statistics and memoranda as to the



relative interest and importance of each county in grain production, which that gentleman very recently addressed to the "Farmer and Chamber of Agriculture Journal," and from which I extract two useful tables for reference, lettered respectively H and I, in the Appendix to this paper, he proposed to cut in two the nearly equal bisection of England into grazing and corn counties, which was originally suggested by Sir James Caird, and is now employed in our own official statistics. Mr. Little quarters as it were the counties into an eastern, a south-eastern and east midland, a south-western and west midland, and a northern division, arranging the counties in the following order:—

East.		West.	
Group I. Containing Nine Eastern and North- Eastern Counties.	Group II. Containing Thirteen South-Eastern and East Midland Counties.	Group III. Containing Ten South-Western and West Midland Counties.	Group IV. Containing Ten Northern and North- Western Counties.
(a) Cambridge Suffolk Essex Herts Beds Hunts	(a) Kent Surrey Sussex Hants Berks  (b) Notts Leicester Rutland Northampton Warwick Oxford Bucks Middlesex	(a) Shropshire Worcester Hereford Gloucester Wilts Monmouth  (b) Somerset Dorset Devon Cornwall	(a) Northumberland Durham York, N.R. „ W.R.  (b) Cumberland Westmoreland Lancashire Cheshire Derby Stafford

He recommends these four divisions as clearly distinctive, and they have the advantage of possessing no great dissimilarity in the extent of their cultivated area. That on the extreme east possesses all the English counties which have more than two acres out of every five in corn, the next embraces a smaller percentage of corn-growing acres, and so on. The percentages of corn generally, and of each of the three leading cereals in these great provinces, and in certain subdivisions of these provinces, which I myself suggest, are exhibited in the table subjoined, the figures of which are calculated not on the area under each crop in any given year, but on the mean area in each county during the ten years 1872-81:—

*Cultivated Area and Area occupied by Corn Crops in Divisions on the Average of the  
Ten Years 1872-81.*

[000's omitted.]

Divisions or Groups of Counties.	Cultivated Area.	Per Cent. in Corn.	Wheat.	Percentage of Cultivated Area.	Barley.	Percentage of Cultivated Area.	Oats.	Percentage of Cultivated Area.
	Acres.		Acres.		Acres.		Acres.	
I.—Eastern and North- Eastern (a) .....	2,880,	49	605,	21'0	429,	14'9	137,	4'7
„ (b) .....	3,222,	42	580,	18'0	452,	14'0	205,	6'4
	6,102,	45	1,185,	19'4	881,	14'4	342,	5'6
II.—South-Eastern and East Midland (a) ....	2,765,	34	399,	14'4	189,	6'8	236,	8'5
„ (b) .....	2,979,	31	384,	12'9	263,	8'8	140,	4'7
	5,744,	32	783,	13'6	452,	7'9	376,	6'5
III.—West Midland and South-Western (a) }	3,157,	26	394,	12'5	215,	7'1	109,	3'4
„ (b) ...	2,956,	24	277,	9'4	200,	6'7	179,	6'1
	6,113,	25	671,	11'0	415,	6'8	288,	4'7
IV.—Northern and North- Western (a) .....	3,107,	22	212,	6'8	212,	6'8	219,	7'0
„ (b) .....	3,188,	15	155,	4'9	67,	2'1	243,	7'6
	6,295,	19	367,	5'8	279,	4'4	462,	7'3
V.—Wales .....	2,716,	19	104,	3'9	153,	5'6	240,	8'8
VI.—Scotland .....	4,650,	30	94,	2'0	262,	5'6	1,018,	21'9
VII.—Great Britain .....	31,620,	29	3,205,	10'1	2,445,	7'7	2,726,	8'6
VIII.—Ireland .....	15,529,	12	161,	1'0	227,	1'4	1,460,	9'4
IX.—United Kingdom .....	47,291,	24	3,377,	7'1	2,680,	5'7	4,196,	8'8

For the localisation of grain produce it will be seen by this table that I purpose to go one step further than Mr. Little, and venture yet again to divide his proposed areas, so as to recast our agricultural map of England into eight corn growing provinces, in each of which sections the proportion of corn diminishes from the section preceding it. Thus in the northern area I think it will aid our investigation to rank Northumberland and Durham with the North and West Ridings of Yorkshire, rather than with Cumberland, Westmoreland, Lancashire, or Cheshire. The dividing line drawn in this case cuts off a north-western group of counties which stand emphatically by themselves as the group least concerned of any in England with the growth of corn, only 15 per cent. of the cultivated area being there employed in this way. It is for some purposes a merit also, I believe, of the plan I suggest, that roughly speaking the cultivated areas, *i.e.*, of course the areas accounted for in the yearly returns, in each of these provinces or districts, are by no means unequal—each of the eight groups on the average of the past ten years' statistics embracing a little under or a little over 3,000,000 acres. To the 24,000,000 cultivated acres of England, I must of course add in a separate division the 2,700,000 of Wales, and the 4,600,000 returned for Scotland, while I append the figures for Ireland and for the United Kingdom (including the Channel Islands, &c.) for convenient comparison.

I have arranged the data I have been able to put together respecting the yield of the chief cereal crops at the present time and at various earlier periods, under counties grouped in the manner I have ventured to recommend, and I would call attention to the detailed results as shown in the tables. Under the arrangement proposed the variation of yield in the several counties or groups of counties may be traced, and so far as we have acreage returns, the gross produce at different periods may be with a little trouble calculated.

With the view of showing how the data thus grouped may be made available to exhibit the relative grain production of different geographical sections of the country, I supply the following statement, which gives a summary of the results of the latest and most complete inquiry into the crops of the past season, and enables us at a glance to see where the chief volume of wheat, of barley, or of oats is raised.

*Statement of Average Yield of Wheat, Barley, Oats, and the Gross Produce of each District in the United Kingdom at the Harvest 1882, calculated from the inquiry made for the "Farmer and Chamber of Agriculture Journal."*

[000's omitted.]

	Wheat.			Barley.			Oats.		
	Acres.	Yield in Bushels per Acre.	Produce in Quarters.	Acres.	Yield in Bushels per Acre.	Produce in Quarters.	Acres.	Yield in Bushels per Acre.	Produce in Quarters.
I. Eastern and North-Eastern (a) .....	580,	28·8	2,091,	411,	34·4	1,775,	145,	53·3	966,
(b) .....	561,	28·0	1,965,	443,	35·1	1,942,	218,	50·9	1,386,
Total .....	1,141,	28·4	4,056,	854,	34·8	3,717,	363,	51·8	2,352,
II. South-Eastern and East Midland (a) .....	366,	29·0	1,326,	172,	34·9	751,	228,	55·4	1,580,
(b) .....	361,	25·7	1,159,	226,	32·1	908,	139,	43·3	752,
Total .....	727,	27·3	2,485,	398,	33·3	1,659,	367,	50·8	2,332,
III. Western and South-Western (a) .....	359,	23·8	1,067,	192,	28·2	678,	123,	38·0	584,
(b) .....	254,	22·0	701,	174,	30·0	654,	199,	38·0	947,
Total .....	613,	23·0	1,768,	366,	29·1	1,332,	322,	38·0	1,531,
IV. Northern & North-Western (a) .....	201,	25·0	631,	182,	31·6	732,	238,	41·2	1,239,
(b) .....	146,	24·6	449,	56,	28·7	201,	256,	40·9	1,310,
Total .....	347,	24·9	1,080,	238,	31·3	933,	494,	41·0	2,549,
Wales .....	95,	22·6	268,	135,	27·7	467,	251,	35·0	1,100,
Scotland .....	79,	31·6	312,	262,	36·0	1,179,	1,049,	41·4	5,428,
Great Britain .....	3,004,	26·6	9,969,	2,255,	32·9	9,287,	2,834,	43·2	15,292,
Ireland .....	153,	26·0	497,	188,	34·0	836,	1,397,	38·2	6,671,
United Kingdom .....	3,164,	26·5	10,490,	2,452,	33·2	10,159,	4,245,	41·5	22,030,

If these aggregate results of the latest inquiry may be accepted as giving a truthful picture of the crop of 1882, they show us that the United Kingdom produced a wheat crop of but little under 10,500,000 quarters, whereof nearly two-fifths was grown in the nine eastern and north-eastern counties of England comprised in my first division, and another fifth or fourth of the whole in the second division of south-eastern and south midland counties: some 70 per cent. of the wheat crop of the kingdom being raised in these two sections of England. This is a fact to be borne in mind, as indicating where it is that a falling off of wheat production and diminished scale of prices for wheat falls with peculiar and crushing effect. In the same way the chief regions of the barley and of the oat crop may be seen; the main features of such a table impressing on the mind the comparatively limited

area of the bulk of our wheat growing, and the very different proportion which the oat crop holds in Scotland and Ireland to the rest of the kingdom—a good deal more than half of what is in bulk the largest of all our cereals being the produce of the sister countries. The difference in the yield of the cereals in the different sections of the country is also well worthy of attention, and it is at least curious to see that small as is the Scotch area of wheat, it produced, where it is grown, at all events last harvest, a considerably weightier crop than in England.

Although the comparatively small area devoted to pulse crops attracts less interest to their yield either per acre or in the aggregate, I may append the following table showing the mean acreage produce in bushels as returned to me in the districts quoted on the occasion of the inquiry I have just completed for the crop of 1882, and for the average of twenty years:—

	Peas.		Beans.	
	Crop of 1882.	Average of Twenty Years.	Crop of 1882.	Average of Twenty Years.
England—				
I. E. and N.E. counties	29·1	26·6	34·6	28·0
II. S.E. and E.M. „	27·4	27·2	32·6	29·8
III. W. and S.W. „	22·1	24·0	27·6	25·0
IV. N. and N.W. „	27·0	26·8	30·9	26·9
Wales .....	20·6	22·8	34·0	33·0
Scotland .....	27·3	28·7	33·5	31·5

So far as the root crops are concerned, they must be mainly regarded as employed in the manufacture of beef or mutton, and so are not an ultimate but only an intermediate product. Less importance attaches to their localisation, especially as the meat production of the several counties or provinces is a matter which cannot, as our returns are now collected, be localised at all, owing to the moving of stock from one part of the country to another.

It may, however, be worth while to give briefly the estimated produce of the past year in this case also, in tons per acre:—

	Turnips.		Mangolds.		Potatoes.		Hay and Clover.	
	1882.	Average.	1882.	Average.	1882.	Average.	1882.	Average.
England—								
I. E. and N.E. counties	18·6	15·4	19·6	22·3	5·4	4·9	1·7	1·4
II. S.E. and E.M. „	17·1	16·0	19·8	23·2	4·9	5·3	1·7	1·3
III. W. and S.W. „	16·8	17·1	19·9	23·0	3·4	5·0	1·7	1·4
IV. N. and N.W. „	18·3	18·2	16·0	17·8	5·7	6·3	2·1	1·7
Wales .....	14·0	15·9	15·4	20·3	3·0	4·1	1·5	1·7
Scotland .....	17·8	16·6	14·0	14·0	3·1	5·8	1·9	1·6

*Fluctuations of Yield.*

Looking, however, at England as a whole, there is much that is interesting in the fluctuation of the mean yield of the country at the different periods noted in the tables which I append. It may be noticed that the 23 bushels at which Arthur Young placed our English wheat crop in 1770, was lowered subsequently to 21 bushels, the mean of the figures McCulloch quoted from the Board of Agriculture Reports. In 1850 Sir James Caird's careful estimate showed a material advance to an average of  $26\frac{1}{2}$  bushels. Eleven years later the decidedly higher estimate of 29 bushels was arrived at by the "Mark Lane Express" inquiry. Sir James Caird, it may be remembered, in a paper read to this Society, estimated the yield at a bushel less, or 28 bushels, in 1868. The "Chamber of Agriculture Journal" returns of 1870, which are given in my tables, raised the estimate for all England to within a minute fraction of 30 bushels, and the result of the entirely independent inquiries made under the late Commission virtually corroborates this high figure, giving as the mean of thirty-six counties a pre-depression average little under  $29\frac{1}{2}$  bushels. The average of the Assistant Commissioners' statistics of yield in 1879 is somewhat higher than the commonly received version of that most disastrous year, working out at 19.7 bushels per acre. The "Mark Lane" estimates of the average of the seven depressed years 1876-82 appears to be 24.7 bushels; while the results of the inquiry now reported by the "Farmer and Chamber of Agriculture Journal" show the normal wheat yield over Great Britain to be still held by a large array of competent inquirers to reach 28 bushels, although the crop of the present year is but  $26\frac{1}{2}$  bushels.

The fluctuations of the English barley crop are equally deserving of attention. Taking McCulloch's estimate as a starting point, the mean for England was 32 bushels at the opening of this century. Both Sir James Caird in 1850, and the "Mark Lane" in 1861, raised the average to 38 bushels, while my own inquiries this autumn tend to place an average crop for Great Britain at somewhat less than 35 bushels, and the barley crop of 1882 at no more than 33 bushels, figures which tend to indicate that the production of barley, like that of wheat, has received a manifest check.

Even in the case of oats, though the crop of 1882 has been exceptionally good in England, nearly reaching 46 bushels per acre, my inquiries incline to a lower normal average, not much over 40 bushels, than that prevailing in the 1861 and 1850 inquiries when 46 and 44 bushels per acre were counted on,

*Estimates of Total Production.*

It is time, however, to inquire how far the fragmentary records of production, which alone we have in this country, can be utilised to enable us to estimate the gross outturn of the great rural industry whose sufferings have been the theme of most recent inquiry. We have many reasons to distrust the basis on which many earlier estimates were constructed, but the more recent conjectures and calculations may help us to some knowledge of the advance or decline of production.

Before the commencement of this century, Arthur Young, in his report on Essex, valued English agricultural produce at 145,800,000*l.*; but as his acreage basis was wrong, this was probably excessive. Other estimates are referred to by Mr. McCulloch, such as those of Mr. Middleton, who put the total at 126,690,000*l.*; or of Mr. Stevenson, in the "*Edinburgh Encyclopædia*," who placed it at 131 million pounds. McCulloch himself named a figure close to this, or 132,500,000*l.*, for English agriculture alone, and adding his estimates for Scotland, we get a total of 155 million pounds; but from this he deducts 12 million pounds for seed, and to keep up the stock of horses, arriving at a net sum of 143 million pounds. As the population in 1836 was taken at 18 millions, very nearly 8*l.* a head was the estimated production in Great Britain nearly fifty years ago. Ireland was separately reckoned as yielding in the gross from 45 to 55 million pounds. Thus, according to McCulloch's estimates, we shall arrive at a total for the United Kingdom nearly half a century ago, deducting simply seed and replacement allowances, of from 183 million pounds to 193 million pounds, accordingly as the higher or lower Irish estimates are adopted. Owing to the low figure given to Irish produce, the head rate for the whole kingdom would not even with the higher figures much exceed 7*l.*

A comparatively recent estimate of the gross production of the United Kingdom, to which, of course, we naturally turn for the truest approximate of the whole supplies our crops and stock furnish, is embodied in Sir James Caird's introduction to that very valuable series of reports on British agriculture which the Royal Agricultural Society of England presented to the International Agricultural Congress at Paris in 1878. In an earlier paper addressed by the same high authority in 1868 to this Society, an estimate of home produce as measured by value and contrasted with foreign food supplies, was given. It distinguished between the production of the three divisions of the United Kingdom—a not unimportant matter when the special character of Irish agriculture is remembered—whereas in the second, which was in other respects

much the fuller estimate, the United Kingdom was dealt with as a unit. But as the form and design of the two statements does not admit of their being conveniently put side by side, or their totals taken as parallel views of gross production at dates separated by a complete decade, I can only refer to the later statement, as that now most usually quoted. It showed a total value of 261 millions of home produce, or very nearly 8*l.* per head: no very great rise from McCulloch's estimate forty years before. Sir James Caird's figures may be thus analysed:—

[000's omitted.]

	Production of the United Kingdom in 1878.	
	Weight.	Value.
(a.) <i>Vegetable Products</i> —	cwts.	£
Corn .....	177,000,	87,087,
Potatoes .....	111,000,	16,650,
Hay and straw .....	120,000,	22,000,
(b.) <i>Animal Products</i> —		
Meat .....	24,500,	87,000,
Milk.....	—	26,000,
Cheese and butter .....	3,000,	13,500,
Wool .....	1,214,	8,500,
Total .....	436,714,	260,738,

In the interval between this calculation and the earlier one by the same high authority made ten years before on wholly different lines, it is remarkable that while corn and potatoes, two items which by themselves at least may be compared, jointly contributed in value only a single million pounds to the increased production; on the other hand, the development of animal products was most remarkable, the single item of meat rising by 40,000,000*l.* or 85 per cent. in this one decade. There is, however, a consideration which ought not to be overlooked, and which, quite apart from the different level of values, explains away a large portion of this extreme rise, for in the earlier estimate—framed rather for purposes of comparison with foreign supplies, than designed to show our own production here—all meat produce from pigs is excluded, on the ground that they are virtually already accounted for in the meal and potatoes. In the later figures bacon and pork are specially allowed for as meat. If therefore these forms of food represented in value (as Mr. J. A. Clarke maintained in the same series of Royal Society's essays, in 1878) the large aggregate of upwards of 20,700,000*l.*, more than half of the apparent enormous rise in meat appears to be accounted for.



*Meat Production.*

I have devoted a good deal of labour to the closer investigation of this intricate question of meat production, but the conflicting information to be gleaned in different quarters, and the strangely varied estimates of the authorities who have approached the details of the subject, have to some extent rendered me more uncertain than when I began what I am bound to confess is an incomplete inquiry. I find that in the older conjectures of agricultural economists, the vagueness which I have noted as to areas is far outdone by the divergence prevailing even as to the numbers of our live stock. Arthur Young himself made more than one widely different estimate. In 1779 he proposed a figure somewhat short of 3,500,000 head to represent our cattle of all ages and descriptions in England and Wales. McCulloch in 1837 gave for England and Wales a total of over 4 million head; and he pointed out that despite the increase of tillage which distinguished the earlier years of this century, the stock of cattle had certainly augmented. In 1854 the Poor Law Inspectors, on the basis of the statistical experiment they had made in the counties of Hants, Wilts, Leicester, Norfolk, Suffolk, Berks, Worcester, Salop, Brecon, Denbigh, and the West Riding of York, ventured to estimate the cattle of all England at only 3,400,000, of whom, roughly speaking, they took 40 per cent. as cows, 40 per cent. as grown cattle, and 20 per cent. as calves.

The guesses at our sheep stock have been still wider. Very early in the century foreign calculators have credited us with 45 and even 55 millions of sheep; McCulloch was, as usual, nearer the mark, placing the English flock at 26 millions, the Scotch at 3,500,000, and the Irish at little over 2 millions, and suggested an aggregate of 32 millions in 1847.

We now know the numbers of live stock pretty accurately, and the districts where they are found in summer, but we are still puzzled by differing estimates of the meat they yield us. In 1837 McCulloch calculated that exactly a fourth of the cattle were slaughtered annually, and his estimate of the annual value of English beef and veal produce was just under 15 million pounds; mutton he took at 10 million pounds, and for pig meat he estimated only a value of a single million, making the entire meat production of that period a matter of 26 million pounds only, or less than the wheat crop of the period: whereas we have seen the latest estimates of our time represent our home grown meat supplies as worth fully as much as our whole grain crops collectively.

In his estimates of meat production in 1868, Sir James Caird also assumed that a fourth of the whole head of cattle of all ages in these islands came annually to the butcher, as well as one-third of the English and Irish, and one-fourth of the Scottish stock of

sheep; and at an overhead value as to cattle of 16*l.* in England, 8*l.* in Scotland, and 7*l.* in Ireland, and an average price of 35*s.* each for sheep, he reached in 1868 a total meat value, leaving pigs out of account, of 47,200,000*l.* The vast rise in the value of meat from McCulloch's time would of course alone explain much of this increase. Taking from the "Royal Agricultural Society's Journal" of 1878 the prices per lb. actually realised for live animals by the producers of ordinary as distinct from high class stock, it would seem that between 1849 and 1868 beef rose from 4½*d.* per lb. to 7*d.* per lb., and mutton from 5*d.* per lb. to 7½*d.* per lb., or 50 and 55 per cent. respectively. These altered values must be remembered when the growth of production is measured by value; but there can also be no doubt that in this interval the production of meat was greatly augmented, a much advanced rate of consumption prevailed, and the earlier maturity of our improved system of agriculture furnished the meat demanded by the people.

The two estimates most quoted as to meat production are the elaborate calculations of Mr. H. S. Thompson, in 1871, and Mr. J. A. Clarke, in 1871-73 and 1875. I find that Mr. H. M. Jenkins, in his interesting paper on the production of large and small farms, in 1872, adopts the former estimate. Mr. James Howard in 1876 follows on the whole the second, though he made some suggestions for altering the weight originally suggested by Mr. Clarke, especially in the case of pigs. Mr. Bourne, in his very valuable inquiries into our food supplies, also relies on Mr. Thompson's data, as most valuable for comparative purposes. Sir James Caird, in his 1878 estimate, in naming 1,225,000 tons as the meat production of the United Kingdom, arrives by, I presume, an independent road, somewhat like that he followed ten years before, at a figure practically identical with the earliest of Mr. Clarke's three estimates, that made in 1871, on the basis of the average stock of 1867-70, which gave a total of 1,214,000 tons.

It may therefore help us if we contrast the estimates of Mr. Thompson and Mr. Clarke, and the former estimates of the latter gentleman, with the corrected calculations he has supplied for later years:—

	Mr. Clarke, 1867-70.			Mr. Thompson, 1871.		
	Cattle.	Sheep.	Pigs.	Cattle.	Sheep.	Pigs.
Total number .....	9,032,000	34,116,000	3,522,000	9,348,000	31,417,000	4,137,000
Number slaughtered .....	2,581,000	17,058,000	3,522,000	2,337,000	13,195,000	4,799,000
Percentage " .....	29	50	100	25	42	116
Average weight, in lb. ....	560	56	90	600	60	134
Aggregate weight of beef, veal, mutton, lamb, pork, or bacon, in tons .....	645,000	426,000	143,000	626,000	353,000	287,000

These two estimates, it would seem, did not vary greatly in the aggregate; the details are however differently made up. In the case of beef and veal, though Mr. Clarke assumes 29 per cent. as against 25 per cent. to be slaughtered annually, he took at the time a lower average weight than Mr. Thompson, and so the estimates of both authorities were not far apart. The results in mutton and lamb differ in the proportion taken; but Mr. Clarke's estimate starts also from a higher average number of sheep. The estimate of meat supply furnished by pigs varies materially, twice as much being obtained according to Mr. Thompson as according to Mr. Clarke. The last named gentleman, however, modified his figures considerably in two later years, first in the tables submitted to the Select Committee on Contagious Diseases (Animals), 1873, and again in the data published in 1875, and embodied in his 1878 report on British agriculture. I give these further calculations under the dates 1873 and 1878 respectively, so far as I can discover the figures, but the head of stock on which the result is based seems rather an estimate for a somewhat earlier period than the live stock census of those particular years:—

	Estimate, 1873.			Estimate of 1875 and 1878.		
	Cattle.	Sheep.	Pigs.	Cattle.	Sheep.	Pigs.
Total numbers .....	9,260,000	33,000,000	—	10,143,000	33,000,000	—
Number slaughtered .....	1,750,000	10,640,000	4,846,000	1,935,000	9,000,000	4,800,000
Percentage " .....	19	32	—	19	27	—
Average weight, in lb. ....	514	67	134	637	69	149
Aggregate weight, in tons	401,000	318,000	288,000	550,000	278,000	319,000

Without entering into the extremely intricate details of the several estimates, the proportion of young animals to grown stock slaughtered, and so on, it is easy to see the fluctuations of opinion as to the total of meat produce. On looking into the several elements of each calculation, it will be seen both Mr. Clarke's later tables indicate a remarkable reduction as to the proportion of cattle and sheep slaughtered, less than one-fifth in place of more than a fourth. There is, however, an increase in the weight at which the average carcass at all ages of each class is to be computed. The weight of cattle slaughtered according to Mr. Thompson is taken as 626 lbs.; while Mr. Clarke makes it first 560 lbs., then reduces it to 514 lbs., and finally raises it to 637 lbs. Sheep show some, though not the same, variation, and pigs vary most of all. So much so that with the 1871 figures of Mr. Clarke, and at 7*d.* per lb., this class of produce represents only some 9,500,000*l.*,

whereas the sum would be, as we have seen, well over 20,000,000*l.* sterling if the last and highest estimates be accepted as correct.

According to these figures we have three estimates varying, as it were, from over the 1,200,000 tons arrived at on independent grounds both by Mr. Thompson and Mr. Clarke in 1870-71, to only 1,000,000 tons in 1873, and back again to 1,147,000 tons on the later date. In the perplexity caused by these several estimates, the question has been asked, whether, since there is no insuperable difficulty in calculating the weight of the foreign butchers' meat imported, either in the shape of live or dead imports, we could not, by reference to an assumed standard of average consumption, discover by this means a test as to which of the three systems is nearest the mark, in estimating the home production. On the population of the several dates the three sets of figures named represent a head rate supply of home-grown meat of 87 lbs. each in the first instance, 70 lbs. in the second and lowest instance, and 78 lbs. in the last. The foreign supply, which is known, and (if the estimates employed as to average weight of foreign live stock are good) which may be closely calculated, would appear to be about 9 lbs. on the first, 14 lbs. on the second, and 21 lbs. on the third of these occasions. Placing British and foreign meat together, this would seem to imply a fluctuating consumption of 96 lbs., 84 lbs., and 96 lbs. as respectively occurring at the different dates. To me it seems the lowest of these head rates is too low to be right. It is not likely such changes of meat consumption took place in our population. But it should be remembered if the principle on which the latest data are made up be accepted as the most correct, then we should have to reduce the 1,200,000 tons of the 1871 estimate by about one-sixth; and if we did so reduce the home supply, it would appear that there had been a considerable increase in the head rate of meat consumption between 1870 and 1875, since the consumption of the earlier year would be but 72 lbs., including all sources of supply. Applying the data as to beef and mutton of the latest of these figures to the present live stock of the country, and taking in the matter of pigs the 116 per cent. allowance for slaughter which Mr. Thompson originally proposed, it might be possible to see what the existing meat production is to-day. Adopting Mr. Clarke's latest method of calculation, it would seem that something scarcely if at all over 1,000,000 tons is now produced, while if Mr. Thompson's more liberal scale of production be still adhered to, the outturn would still not much exceed 1,240,000 tons. If the first of these figures is anywhere near the mark, it would, roughly speaking, indicate a head rate consumption of only 63 lbs. of home grown meat. If the larger figure be right, then 78 lbs. is the yearly meat ration our

own stock now supplies. As the foreign supplies of meat and live stock are now ascertained for 1882, it would seem the total meat available from abroad comes to very little over 22 lbs. a head. It would therefore follow, if we are to keep to an assumed consumption of something like 100 lbs. per head, the larger of the two home estimates must be held to be the most accurate. If the other can be substantiated, and no one who has examined in detail the elaborate data on which Mr. Clarke based his calculations can deny it has intrinsic claims on our acceptance, then it would follow that there had been a falling off and not an advance in meat consumption in recent years.

### *Milk and Dairy Produce.*

Another very interesting branch of our farm production is that of milk and dairy produce. Here also a good deal of uncertainty exists as to facts, and I have been unable to complete my inquiry to my own satisfaction. Writing in 1878, Mr. John Chalmers Morton, whose right to speak with authority on the matter is considerable, placed the milk produce of Great Britain at 1,000 million gallons annually, reckoning 440 gallons per annum to each cow. Mr. Clarke, in the same volume of the Royal Agricultural Society, thinks 420 gallons a safer estimate. But adhering to the larger figures, it may be well to quote Mr. Morton's estimate of the ultimate disposal of this milk: one-sixth part or 167 million gallons he allows for the calves reared, which cannot of course be reckoned with as part of the yearly produce at all; 312 million gallons of milk he would apportion to cheese making, giving us 2,800,000 cwt. of cheese yearly; 156 million gallons go, he tells us, to produce 530,000 cwt. of butter; leaving a million gallons a day, or 365 million gallons in all, for the daily milk consumption of our population. But these estimates must be materially added to if the Irish dairy produce be considered, while it is not improbable that the increased consumption of milk which has undoubtedly taken place since 1878 is met by a reduction both in butter and cheese.

### *Wool.*

Wool, although not an article of food, must not be left out of account in any estimate as an important item in our national production; but the precise amount at which it should stand either as to quantity or value has been a matter of some controversy. The following are some of the estimates of quantity made at different periods during the century:—

## ENGLAND ONLY.

Date.	Authority.	Number of Sheep.	Method of Calculation.	Weight of Clip in lb.
1800 {	Mr. Luccock, Wool Merchant (Leeds) }	26,148,000	Long woolled ..... 4,153,000 Short „ ..... 14,854,000 Total shorn..... 19,007,000 Add for sheep slaughtered and carrion (long wool) ..... 1,239,000 Ditto (short wool) 4,433,000 Lambs ..... 1,470,000	94,377,000
'28 {	Mr. James Hubbard and Sir George Goodwin (Leeds) }	—	—	111,161,000

## UNITED KINGDOM.

1845...	Professor Low .. .. .	35,000,000	Average weight per fleece, 4½ lb. ...	157,500,000
'58 {	Mr. E. Baines, at British Association (Leeds) .. .	—	—	175,000,000 (15,000,000 exported)
'70 {	Mr. Archibald Hamilton, Statistical Society's <i>Journal</i> , from Messrs. Hubbards' tables .. .	34,138,000 (all ages)	Sheep shorn yielding 124,000,000 lb. Lambs shorn in certain counties .... 2,470,000 „ Skin and wool ..... 33,482,000 „	159,952,000
'75 {	Earl Cathcart, in "R. A. S. E. Journal," from Messrs. Hubbards' tables ....	22,189,804 (one year old and upwards only considered)	Sheep in 1867-69, weight of fleece worked out county by county, but only sheep actually shorn allowed for .. .	124,000,000
'78 {	Mr. J. A. Clarke, "R. A. S. E. Journal," 1878, from Messrs. Hubbards' tables .. .	21,492,000 (one year old and upwards only considered)	Sheep in 1875-76, worked out as above; average weight of fleece 5½ lb.; no allowance for lambs and slaughtered sheep .. .	119,473,000
'78...	Sir James Caird .. .	—	—	136,000,000
'80 {	Helmuth Schwartz and Co.'s Wool Circular .. .	—	Estimate of shorn sheep : Average 1870-74 ..... 157,000,000 „ 1874-79 ..... 155,000,000	157,000,000 155,000,000
'82 {	"Bradford Observer," wool tables .. .	27,840,000 (in 1881)	Calculated on both sheep and lambs at fixed weights of fleece by counties (average 5½ lb. per fleece), and deduction made from total of 3 lbs. per head on lambs of 1882 + aggregate decrease of sheep and lambs between 1881 and 1882, which is taken to represent the slaughtered sheep of the year .. .	129,000,000

It will be seen that in most of these cases a material difference is evident, even when a similar basis is used as a starting point. Thus, although founding on Messrs. Hubbards' tables employed by Mr. Archibald Hamilton in his valuable paper of 1870, Lord Cathcart and Mr. Clarke make the very material difference of refusing any allowance for fleeces of slaughtered sheep and lambs, thus greatly reducing their estimate below those of other authorities. It is however well worth noting that if Mr. Hamilton's complete plan be adopted, the yield of British wool this year works out in remarkably close correspondence with the 129,000,000 lbs. which is reached by the "Bradford Observer" tables: the actual figure being 128,815,000 lbs. Under the lower scale adopted by Mr. Clarke the wool clip of this year would not quite reach 100,000,000 lbs., or not much more than was thought to be grown at the commencement of the century. I cannot but view such a figure as decidedly too low, though the ravages among our flocks threaten largely to reduce our yearly clip. Over a series of years, and taking the "Bradford Observer" data, we are able very clearly to see by the following figures the important decline both in production and in value which has taken place in this one item of wool: pointing out, however, that the values are only roughly given, and taken on the quoted prices of Lincoln hogg wool:—

Date.	Clip in lb.	Average Price.	Total Value.
		<i>d.</i>	£
1873 .....	165,350,472	24½	16,880,000
'74 .....	167,042,379	20¾	14,439,000
'75 .....	161,782,536	19¾	13,313,000
'76 .....	155,835,320	17¾	11,525,000
'77 .....	152,172,010	16½	10,303,000
'78 .....	151,700,736	15	9,481,000
'79 .....	153,233,696	12½	7,981,000
'80 .....	148,729,061	15½	9,373,000
'81 .....	138,574,672	12¾	7,145,000
'82 .....	129,006,659	11½	6,047,000

Such a table affords very specific evidence of diminished produce, and still more diminished value in the past decade. It is well worth remark that while the gross produce of wool is thus less by some 22 per cent., the value of the wool crop to the British farmer is lessened in a far greater ratio.

#### *Diminution of Produce.*

Having run through the more prominent items of agricultural production, it was my intention to have offered some rough estimate on the basis of such calculations as have been made as to the total produce now compared with our latest estimate, that of

Sir James Caird. I have been disappointed in my hope of doing this. Far more care and deliberation would be required, and much longer reflection than I have had time for. The story of reduced production has, however, been told to the Royal Commission not only in estimates for the whole country, by three statisticians, two of whom have held, and one now occupies, the chair of this Society, and I do not yet despair of seeing the basis of their several calculations discussed here. Many facts bearing on the matter also are reported for large areas by the Assistant Commissioners, and many more individual and typical instances might be collected from the evidence. I would only here remind you that Sir James Caird has himself forcibly represented the six years' loss in the United Kingdom as equivalent in money value to something like two years' rent of the whole land of the country, or in the aggregate, 139,000,000*l.* This if averaged on each year would represent a yearly diminution of receipts equal to some 23,000,000*l.*; and by as much as that at least I conclude he would reduce his own figure of 1878. Mr. Lefevre's figures, which were very different in their form, and restricted to Great Britain alone, landed us in a loss, which, spread equally in the shape of an annually diminished production over each of the six years, would be something like 26,000,000*l.* per annum. Mr. Giffen's much more elaborate calculation, based on the excess of imports over a given period beyond what would have been needful for the increased population appears to rest on a higher head rate of total consumption than that of Sir James Caird (who in his evidence to the Royal Commission took 9*l.* 5*s.* 6*d.*, only as the standard). He held that in the aggregate though lowered prices were a more material consideration than reduced production, grain produce was diminished in value by nearly 24 million pounds, leaving us a crop of 63 million pounds only, in place of one of 87 million pounds; while on the whole balancing certain advances against heavy reductions of outturn and of value, from 38 to 45 million pounds were of late years lost. This, however, was not a statement of actual diminution of production, but a comparison of debit entries against the farmer, and included outlays paid by one member of the agricultural class to another in rent or wages. Excluding these, the outcome of his figures would still leave us a production which must be at least 30 million pounds a year under that of happier days, and it would appear to be the highest of the three calculations I have mentioned.

I am very reluctant to refrain from prolonging my paper in the direction in which these extremely interesting statistics tempt me, but I am unfortunately compelled to do so; and before passing to the consideration of how produce statistics have been and may be achieved, I will only express the hope that some of the data I have



now gathered as to yield of crops may furnish reliable material for the further investigation of a not yet satisfactorily solved question. I will however notice that taking the grain crops alone, and making those necessary deductions from the bare figures of any such returns as I have only noted before reaching the statistics of *available* produce, I hardly see how the produce of grain and pulse crops, bearing in view present prices, or those prevailing of late, can in the gross exceed 60 million pounds, as against the 87 million pounds of our latest complete estimate. It remains, however, a question worth fair inquiry, how far the non-agricultural horses of the country should be taken account of as a product, or how far in their case, and that of pigs, and even other live stock, some rectification of the totals of grain outturn should not be made lest we reckon the same products twice over. There are, nevertheless, many minor items which may be set against such errors in the special products of hops and vegetables not included in the larger estimates, and in the case of eggs and poultry, and I would add, even timber, which do not seem to me embraced as they ought to be in the customary estimates of our production.

Whatever be the actual figures which properly represent the produce of British soil, two conclusions are, I think, easily drawn from the varied figures I have been able to put before you—one, that the former advance in yearly production is unquestionably checked, that the possibility of future increased production is arrested by the risk of unremunerative enterprise. While no legislation can restore productive climatic conditions, and prevent a loss of capital due to rainfall and want of sun, there is room for many minor improvements of the law, whereby agricultural investments may not be artificially depreciated, and the land, and the capital locked up in its cultivation, no longer treated by the State with financial disfavour, and made to bear exceptional and impolitic burdens.

#### *Foreign Produce Statistics.*

As I have already pointed out, the portion of our English statistics which is still omitted here, and without which we are so largely in the dark as to our total agricultural production, is a prominent feature of the system of foreign countries. The modes adopted are not everywhere the same, and there are unquestionably a good many defects and imperfections in the methods practised, but it will not be out of place, in reference to our possible attempt to establish produce statistics here, to note how this work is attempted and how it is done elsewhere.

In the United States the organisation of the Statistical Bureau of the Washington Agricultural Department has at its command

(I am informed by the representative of that department in London, Mr. E. J. Moffat) the services of a regular but unpaid local staff of some three thousand reporters, representing virtually the whole producing area of the country, county by county. The number of reports from each county varies with its size; and there are now in each State special statistical agents, who tender, I believe, more comprehensive reports, and who supervise and systematise the local information. The latter are of course paid agents, while the services of the ordinary reporters are only remunerated by copies of the agricultural publications of the department. The vote appropriated last year by Congress for crop reports and special statistical work in printing, &c., was, I am told, 16,000*l.*—about the same amount which the collection of our own statistics costs. But this, I take it, may probably not include the cost of the new State agents. The annual system of crop reports is now familiar to us here, consisting as it does of monthly statements of the relative *condition* of the growing crops, signifying the excess or diminution of condition below or above the normal standard, which is taken at 100. The reports bear first on the acreage compared with the previous crop, then on the efficient growth and vitality of the yet unmaturing crop, and finally the yield per acre, with the quality and comparative quantity. Of course the reliability of the statements rests much on the discretion and knowledge of the reporters; but the system seems, if fairly worked and conducted by energetic statistical agents, one which could be reproduced in our own country without great difficulty. If the number of agents named suffices for the enormous area of the United States, then the eight hundred reports from our own country which I have lately collected, show that it would be easily practicable here to furnish a relatively closer and more reliable basis in England than in America.

Russia, next to America, was, at one time looked to by English agriculturists and corn traders with a good deal of agricultural anxiety. There statistics have been forthcoming in different forms; but the last published Russian figures for this country in our official tables here do not appear to come down to a later date than some ten years back. I understand, however, from information obligingly furnished me from the United States' Consulate here, that they are informed by the Director of the Russian Department of Agriculture and Rural Economy at St. Petersburg, that a complete system has been recently established and brought up to date. Upwards of two thousand correspondents have been specially selected from persons interested in practical agriculture. Three separate reports on the Russian crops are now rendered in spring, in summer, and in autumn, in reply to the questions of the Department, and on this

information official records are based. The first report embraces the prospects of the young crops, and condition of live stock; the second includes information as to wages as well as statements as to crops; and the final official reports of the year, besides giving the average yield, publish useful data as to the market price of farm products, and of live stock, and the average weight of grain per chetvert, indicating all changes in the mode of culture, and furnishing, as our own agricultural returns have, I am sorry to see, ceased doing, comparative data as to the production of foreign countries. The complete reports for 1881, and the two earlier ones for 1882, are, I believe, already published.

For intelligence as to the practices of other foreign countries, I have to tender my best thanks for the information kindly placed at my disposal by Mr. Bateman, of the Board of Trade. The French statistics are obtained in separate instalments; the breadth of autumn sown crops being rendered on 11th December yearly, and spring sown crops on 15th May. Some weeks later a report on the condition of the corn crops at flowering time appears, together with a complete acreage statement. In August, we have approximate estimates of yield. In November, a final estimate furnishing the latest data on this head, and a month later the average weights of wheat, barley, oats, and rye are given. Intermediate monthly reports are also rendered, and the whole of this information is collected through the prefects and their staff, the mayor of each commune, with the aid of a local council, I believe, making local reports. This year a specially elaborate decennial census of agriculture has been taken, that of 1872 having been omitted. Commissioners in each canton were appointed for this purpose, with sub-commissioners in each commune when necessary. The services thus rendered are honorary, but a number of gold, silver, and bronze medals are to be allotted to the most deserving members of the commission.

In Germany, estimates of the mean produce of corn and other crops are taken yearly, but only in some of the States is the acreage annually verified, a fact which renders inaccurate the total returns of produce, yearly figures of both acreage and yield being published for the whole empire.

In Austria, use is made by the Government of the various chambers of agriculture for the collection of produce statistics, these bodies receiving from the Government a subvention for this purpose. The data for 1881 appear in our returns.

In Belgium, only the estimated mean yields are obtained annually, the final agricultural statistics being compiled at considerable intervals. In Mr. Jenkins's report on Belgium for the Royal Commission, he points out that the latest complete agricultural statistics of Belgium were collected as far back as 1866, and published in 1870.

In Norway all occupiers were required, in 1875, to make returns of acreage and live stock. Yearly returns of produce and of the value of stock are obtained by the chief officers of large areas. These are taken from the average of certain specimen farms in each subdivision of these areas, but are only estimates.

In Sweden, where a new statistical system has been proposed, but not yet carried out, reports are now made by the Central Department of Statistics from acreage returns obtained by the Economic Society, and from the reports on crops, as "good," "average," and so on, rendered in October by the local authorities.

In Denmark the area under crop is enumerated only every fifth year, the last made public being for 1876. Reports of average yield are, however, locally collected in all parishes, and from these the total produce is calculated at the central office, the value of the crops being also given. The absence of a yearly record of acreage in this case, as in Germany, must render the figures inaccurate.

Taking the foreign statistics, imperfect as some of these are, I had hoped it might have been possible, with the recent data kindly furnished from the Statistical Department of the Board of Trade, roughly to show the relative grain production per acre of the different countries, as I have done our own, for more than one date, and to place this side by side with our own and our colonial production, giving similarly parallel statements of the number of our herds and flocks; these forming legitimate matter for comparison; but I have been reluctantly compelled to acknowledge my inability to complete in time the plan I had projected, and must leave this part of my paper incomplete. The subject of comparative production may well, however, afford scope for future interesting inquiries, which I hope some other member of this Society may undertake.

I cannot, however, pass from this part of my subject without expressing the regret which I know is felt by agriculturists at the discontinuance in our yearly agricultural statistics of the comparative foreign data which formerly was given. Expense may be saved to the Treasury by the virtual burying of the foreign and colonial agricultural statistics among the miscellaneous data belonging to the countries concerned, but a very distinct hindrance to ready and convenient investigation of many agricultural questions is thereby imposed.

#### *Produce Statistics at Home.*

I am now brought to inquire definitely whether, seeing the need of such data, as other Governments more or less perfectly collect, we may not proceed to attempt to carry out a system, and it may be even a better system, at home. I am well aware of the difficulties of reaching even approximate accuracy, and at one time I almost despaired of the practicability of such work. Having now, as

I have already said, just finished the most exhaustive private inquiry of recent years, I must give it as my opinion that there would be no impossibility of doing at least as well, and, I trust, even better in collecting information as America, or Austria, or Russia. If an unofficial person in my position could, with somewhat hurried and imperfect preparations, procure over eight hundred individual opinions from districts so scattered as to fairly represent the cultivated area of Great Britain, I do not think the new Department of Agriculture, when we get it, need despair. The machinery of the existing Chambers of Agriculture would in many, though perhaps not in all instances, prove valuable for the purpose, and every Farmer's Club and every Agricultural Society might be pressed into the service. In some instances you may, no doubt, have refusals to help; and Mr. Rankin, member for Leominster, informs me that as the result of a recent correspondence with the agricultural chambers, he still finds much disinclination on the part of agriculturists to make returns of produce; but what public bodies may shrink from doing officially and on their own responsibility, the more intelligent individual members will probably do personally: and I hardly think, if approached by the new Department, the agricultural organisations of the country would decline to be the medium at least to select the proper reporters for each area. The opposition to a local examination of statements of yield would not apply to their compilation in a wholly independent central office. Great tact will of course be necessary in any combination of official and voluntary work, and you must not be discouraged by being told, as I have been, that all such investigations are "worse than useless," that such questions are "dreaded by many," as likely to be followed by "increased rents:" not, by the bye, an anticipation very common in rural districts in these bad times. In connection with any produce inquiry, which cannot well be made till late in the November of each year, we might perhaps, at least occasionally, have a supplementary return of live stock. The want of a winter to compare with our summer census very greatly impedes the calculations as to the animal produce of our county areas, and such an enumeration would help the solution of some of the general meat supply difficulties to which I have alluded. Districts of counties would of course require to be set out on a very careful and elaborate plan, as to soils and class of farming, and the acreage of each section carefully noted; due weight, and no more, being given to each case of peculiarity in production that disturbs the average level of a county. The work will cost some money no doubt, but I consider it would be money well spent, and I trust the matter will be seriously entertained by our statistical authorities, and the reproach which I have shown attaches to England among other nations in this one statistical particular promptly and finally removed.

TABLE A.—SCOTTISH PRODUCE STATISTICS. Abstract Statement of Yield and Weight of Crops in Counties and Districts, compiled from Highland and Agricultural Society's Reports to the Board of Trade, 1855.

Yield per Acre.							Counties and Districts.	Weight per Bushel.			
Man-golds	Potatoes.	Turnips.	Beans.	Oats.	Barley.	Wheat		Wheat.	Barley.	Oats.	Beans.
Tons.	Tons.	Tons.	Bshls.	Bshls.	Bshls.	Bshls.		lbs.	lbs.	lbs.	lbs.
10	6½	16	26	32	31	26	ABERDEEN.				
—	5½	16½	27	30	32	28	District 1 .....	—	51½	39	—
13	5½	15	34	31	33	28	" 2 .....	—	54	40	—
—	6	15	24	32	32	28	" 3 .....	—	51½	40	—
12	6	16	20	33	38	30	" 4 .....	61	52	40	—
							" 5 .....	59	52	40½	—
							ARGYLL.				
16½	5½	17½	30	32	38	27	District 1 .....	64	50	39	50
15	4½	15	26	26	25	16	" 2 .....	—	52	40	—
16	5	15½	26	30	38	32	" 3 .....	—	52	40	64
4	5	17	33	40	41	32	" 4 .....	60	50	37	60
15½	5	14	14	24	29	—	" 5 .....	—	—	—	—
—	7½	20½	—	23	27	—	" 6 .....	—	52	40	—
—	3	5	—	30	—	—	" 7 .....	—	—	—	—
—	5½	15	—	14	—	—	" 8 .....	—	—	—	—
—	3½	9½	—	28	—	—	" 9 .....	—	—	37½	—
—	5½	18	—	24	—	—	" 10 .....	—	—	—	—
							AYR.				
17	8½	15½	26	34	32	25	District 1 .....	61	52	35	65
16	4½	18½	25	35	34	27	" 2 .....	60	54	34	64
14½	5	17½	28	41	35	26	" 3 .....	59	50	34	62
15	4	16	30	40	35	29	" 4 .....	59½	—	33½	—
13½	4	17	28	43	33	24	" 5 .....	—	—	—	—
							BANFF.				
—	5	14½	32	30	37	28	District 1 .....	—	—	—	—
—	5½	13½	—	32	32	29	" 2 .....	61	52½	40	—
							BERWICK.				
18	7	12½	28	34	32	27	District 1 .....	61	52	41	—
16	8½	13	25	37	33	27	" 2 .....	60	52	40	—
							BUTE AND ARKAN.				
16	5½	15½	24	33	38	30	District 1 .....	61	53½	38	—
11	4½	10½	22	25	35	25	" 2 .....	60	52	36	—
							CAITHNESS.				
—	4	15½	—	35	32	32	District 1 .....	60	49	38½	—
—	4½	17½	—	32	30	34	" 2 .....	58	49	39	—
							CLACKMANNAN.				
15	4½	17	29	33	32	28	District 1 .....	61	52	39	64½
13	6	18	27	34	32	27	DUMBARTON .....	60	51	39	51
							DUMFRIES.				
13	4	16	28	29	29	21	District 1 .....	62	53	39	62
17	5	15	31	29	31	23	" 2 .....	60	51	38½	64
15	5	15	21	28	27	19	" 3 .....	60	51	38	58
19	5	12	33	33	31	21	" 4 .....	60	52	39	63
5	3	11	20	23	23	22	" 5 .....	58	51	39	—
							EDINBURGH.				
16	5½	17½	32	36	37	31	District 1 .....	61	53	40½	62
18	6½	18	35	41	40	31	" 2 .....	61	52½	40	63
11	5	12	26	33	32	26	" 3 .....	—	—	—	—

TABLE A—Contd. *SCOTTISH PRODUCE STATISTICS. Abstract Statement of Yield and Weight of Crops in Counties and Districts, compiled from Highland and Agricultural Society's Reports to the Board of Trade, 1855.*

Yield per Acre.							Counties and Districts.	Weight per Bushel.			
Mun- golds.	Potatoes.	Turnips.	Beans.	Oats.	Barley.	Wheat.		Wheat.	Barley.	Oats.	Beans.
Tons. 10	Tons. 5	Tons. 12	Bshls. 23	Bshls. 28	Bshls. 33	Bshls. 24		lbs. 63	lbs. 55	lbs. 41	lbs. —
							ELGIN .....				
							FIFE.				
14½	5	16	25	30	34	25	District 1 .....	62	53½	40½	63
15½	5	14½	30	34	35	27	" 2 .....	61	52	40½	—
12½	5	14½	28	35	33	24	" 3 .....	61½	52	40	62½
9½	4	15½	29	33	33	25	" 4 .....	60	52	40	62
							FORFAR.				
12	4	12½	25	35	32	26	District 1 .....	61	52	40	—
11½	5½	13	29	31	31	27	" 2 .....	62½	52½	40½	—
							HADDINGTON.				
11	5½	14	27	37	37	26	District 1 .....	—	—	—	—
9½	6	14½	29	41	37	24	" 2 .....	—	—	—	—
14½	7	16	32	54	44	29	" 3 .....	—	—	—	—
17½	6½	17	32	57	43	32	" 4 .....	62½	53	42½	65
21	7	15	30	48	42	26	" 5 .....	61½	53½	41	—
29½	8	15½	29	47	46	30	" 6 .....	—	—	—	—
							INVERNESS.				
8	4	10	24	26	32	25	District 1 .....	—	—	—	—
11	3½	16	20	25	26	22	" 2 .....	61½	53½	41	—
12	4	15	20	28	28	24	" 3 .....	62	54½	41	—
—	4½	14½	—	30	—	—	" 4 .....	—	—	39½	—
—	6	16	—	29	37	—	" 5 .....	—	—	42	—
—	4	17½	—	21	20	—	" 6 .....	—	—	38	—
—	2	6	—	9	—	—	" 7 .....	—	—	—	—
—	3½	14½	—	13	—	—	" 8 .....	—	—	—	—
—	3½	12½	—	13	—	—	" 9 .....	—	—	—	—
12	6	16	33	33	33	30	KINCARDINE.....	61½	52	39½	60½
16	4	13½	23	31	30	29	KINROSS .....	58	52	40	—
							KIRKCUDBRIGHT.				
14½	5	15	31	29	30	24	District 1 .....	60	51	38	—
12	5	16½	26	32	28	25	" 2 .....	60	52	40	—
15	3½	17	24	29	32	26	" 3 .....	60	53	39	—
—	5	13½	24	29	23	—	" 4 .....	—	50	40	—
							LANARK.				
14½	6	15½	30	35	35	28	District 1 .....	59	53	37	—
12	4	12½	25	27	32	25	" 2 .....	59	50	38	—
12½	5	14	28	31	34	30	LINLITHGOW .....	61	52½	40	64
16	4	11	24	26	32	25	NAIRN .....	63	55	41	—
							ORKNEY.				
—	5	12½	—	32	—	27	District 1 .....	—	46	38½	—
—	5	14½	—	35	33	24	" 2 .....	—	—	—	—
—	5	17½	—	22	—	—	" 3 .....	—	—	—	—
7	4½	14	14	34	31	27	PEBBLES .....	60	52½	40	—

TABLE A—Contd. SCOTTISH PRODUCE STATISTICS. Abstract Statement of Yield and Weight of Crops in Counties and Districts, compiled from Highland and Agricultural Society's Reports to the Board of Trade, 1855.

Yield per Acre.							Counties and Districts.	Weight per Bushel.			
Man- golds.	Potatoes.	Turnips.	Beans.	Oats.	Barley.	Wheat.		Wheat.	Barley.	Oats.	Beans.
Tons.	Tons.	Tons.	Bshls.	Bshls.	Bshls.	Bshls.		lbs.	lbs.	lbs.	lbs.
<b>PERTH.</b>											
14	5	14	25	31	28	28	District 1 .....	61 $\frac{3}{4}$	52	40	63 $\frac{1}{2}$
9	4	11	24	31	31	27	" 2 .....	61 $\frac{1}{2}$	52 $\frac{1}{2}$	40	—
—	3	9 $\frac{1}{2}$	17	23	23	20	" 3 .....	61	51	39	—
—	5	14	25	27	29	26	" 4 .....	60 $\frac{1}{2}$	50 $\frac{1}{2}$	39	61 $\frac{1}{2}$
9 $\frac{1}{2}$	4	11	22	27	24	22	" 5 .....	61	51	39 $\frac{3}{4}$	—
20	5	14	27	24	22	23	" 6 .....	—	—	—	—
15	5	11 $\frac{1}{2}$	25	32	31	29	" 7 .....	61	52 $\frac{1}{2}$	39	60
—	5	17 $\frac{1}{2}$	17	30	27	30	" 8 .....	62 $\frac{1}{2}$	52 $\frac{1}{2}$	40	—
—	4 $\frac{1}{2}$	13	23	31	32	24	" 9 .....	61	52	40	—
<b>RENFREW.</b>											
12	6	15	36	37	37	29	District 1 .....	58	—	—	—
15	6	16	27	34	32	23	" 2 .....	58	—	40	—
7	6 $\frac{1}{2}$	17 $\frac{1}{2}$	28	36	36	26	" 3 .....	—	—	—	—
8	4	11	22	24	27	29	" 4 .....	—	—	36	—
<b>ROSS AND CROMARTY.</b>											
10	4 $\frac{1}{2}$	15	25	33	35	25	District 1 .....	62	54	41	64 $\frac{1}{2}$
8	5	14	24	29	32	27	" 2 .....	61	54	40	—
—	5	15	15	32	—	—	" 3 .....	—	—	—	—
—	3 $\frac{1}{2}$	14	30	30	32	—	" 4 .....	—	—	39	—
—	4 $\frac{1}{2}$	16 $\frac{1}{2}$	—	28	28	—	" 5 .....	—	—	—	—
—	6	14	—	26	—	—	" 6 .....	—	—	37	—
<b>ROXBURGH.</b>											
12	7	14	30	40	36	28	District 1 .....	61	51 $\frac{1}{2}$	40	63
—	7	11	26	35	30	26	" 2 .....	60	52	39	—
10	6	14	35	39	32	26	" 3 .....	60	53	40	64 $\frac{1}{2}$
14	4 $\frac{1}{2}$	12	30	36	31	24	" 4 .....	60 $\frac{3}{4}$	51 $\frac{1}{4}$	39 $\frac{3}{4}$	63
8	4 $\frac{1}{2}$	12	24	32	30	23	" 5 .....	61 $\frac{1}{2}$	52	40 $\frac{1}{2}$	—
5	4 $\frac{1}{2}$	14 $\frac{1}{2}$	28	32	30	29	" 6 .....	61	53	39	—
—	4 $\frac{1}{2}$	12 $\frac{1}{2}$	—	32	27	—	" 7 .....	—	49	38 $\frac{1}{2}$	—
—	6	16	17	38	34	31	<b>SELKIRK</b> .....	61 $\frac{1}{2}$	52	40 $\frac{1}{2}$	59
<b>STIRLING.</b>											
—	5	13 $\frac{1}{2}$	27	33	33	27	District 1 .....	—	—	—	—
—	5	14	23	28	27	27	" 2 .....	—	—	—	—
<b>SUTHERLAND.</b>											
—	4	14 $\frac{1}{2}$	30	30	—	—	District 1 .....	—	50	40	—
—	6	14	—	26	32	—	" 2 .....	—	53	36	—
—	4 $\frac{1}{2}$	13	8	31	34	28	" 3 .....	—	—	—	—
—	3 $\frac{1}{2}$	21	—	38	34	37	" 4 .....	60	54 $\frac{1}{2}$	41 $\frac{1}{2}$	—
<b>WIGTOWN.</b>											
13 $\frac{1}{2}$	5	14 $\frac{1}{2}$	25	34	37	27	District 1 .....	60	53	40	66
13 $\frac{1}{2}$	3	14 $\frac{1}{2}$	27	27	27	22	" 2 .....	61	—	38	65



TABLE B.—*WHEAT. Estimates of Yield, in Bushels per Acre, in different Counties of England at various Periods.*

Counties in Groups.	1	2	3	4	5	6	7	8	9	10
	Arthur Young in 1770.	McCulloch, from Board of Agriculture Reports, 1800-16.	Mr. Caird, in 1850.	Mark Lane Express, 1861.	Chamber of Agriculture Journal, 1870.	Royal Commission on Agriculture Reports. Average before 1878.	Crop of 1879.	Average of Seven Years, Mark Lane Express, 1876-82.	Inquiry of Farmer and Chamber of Agriculture Journal. Average of Twenty Years to 1882.	Crop of 1882.
	1770.	1800-16.	1850.	1861.	1870.	1878.	1879.	1876-82.	to 1882	1882.
I. (a.) Cambridge	—	24	32	32·3	33·0	33·0	23·2	27·1	31·6	34·2
Suffolk.....	24	20	32	28·7	28·7	30·4	21·7	27·0	30·0	26·4
Essex .....	24	24	28	31·0	33·0	33·6	22·9	26·0	30·2	29·2
Herts .....	24	20	22	28·0	28·5	26·3	16·3	23·0	28·2	28·7
Beds .....	19	24	25	28·5	30·0	30·5	19·6	25·7	28·6	23·8
Hunts .....	18	24	32	29·0	32·5	30·5	20·2	26·0	30·5	27·0
(b.) Norfolk ....	24	20	32	33·5	31·1	31·6	22·0	28·0	31·5	31·5
Lincoln ....	21	24	26	31·0	32·7	31·6	19·6	23·0	29·0	27·0
East Riding	25	22	30	29·5	30·0	29·0	17·7	—	26·4	24·2
II. (a.) Kent .....	—	22	—	33·0	33·7	34·0	27·4	27·0	32·0	32·1
Surrey .....	—	20	22	27·0	28·0	28·0	22·2	28·2	29·0	27·3
Sussex .....	22	24	22	29·7	30·0	31·0	23·0	23·0	32·0	31·1
Hants .....	20	20	30	27·7	29·5	28·5	19·4	25·8	26·4	25·9
Berks .....	28	20	30	33·5	31·5	32·0	20·2	24·3	32·0	27·5
(b.) Notts .....	31	26	32	29·7	30·0	30·7	22·7	23·0	28·1	25·1
Leicester ....	—	20	21	29·7	31·0	33·0	17·3	26·6	29·0	27·4
Rutland ....	—	22	—	33·0	31·2	—	—	25·0	—	—
Northamtn.	23	22	28	32·5	32·2	32·5	20·4	25·6	31·3	26·4
Warwick .....	28	21	30	30·0	30·0	31·7	19·4	22·3	28·0	23·7
Oxford.....	26	20	25	31·0	31·0	36·0	19·0	25·3	30·1	25·9
Bucks .....	25	22	25	28·5	29·0	30·0	15·2	26·3	29·2	27·2
Middlesex	—	24	—	30·0	31·0	—	—	30·0	—	—
III. (a.) Shropshire	—	20	—	24·2	26·0	21·0	19·1	19·6	24·4	23·2
Worcester	—	22	—	29·2	30·0	—	—	26·8	29·0	24·8
Hereford ....	—	20	—	25·2	29·5	23·0	12·5	21·2	29·7	27·0
Gloucester	20	16	23	27·5	28·0	—	15·2	22·5	25·7	21·7
Wilts .....	20	20	26	28·7	29·0	28·0	19·0	24·5	27·0	23·7
Monmouth	—	18	—	—	29·0	—	—	22·7	25·4	23·0
Somerset ....	—	20	—	29·0	29·0	31·6	—	26·0	27·6	24·2
Dorset .....	20	16	21	29·7	29·0	30·7	18·3	24·0	28·8	25·3
Devon .....	—	25	20	22·2	21·5	24·6	23·2	20·7	21·9	19·0
Cornwall ....	—	24	—	23·7	25·0	29·7	14·1	24·0	29·6	23·8
IV. (a.) Northum-berland..	18	24	23	26·0	27·0	28·6	30·0	21·0	28·1	29·7
Durham ....	25	21	16	25·2	26·0	28·0	17·8	22·5	29·1	28·1
York, N. R.	21	22	20	29·5	30·0	28·0	19·0	22·0	27·1	21·7
„ W. R.	20	22	30	29·5	30·0	25·0	17·6	—	25·7	24·7
(b.) Cumberlnd.	23	20	27	—	29·0	—	—	29·2	22·7	21·3
Westmorlnd.	—	20	—	28·7	28·0	20·0	15·0	—	20·0	24·5
Lancashire	26	18	28	34·2	32·0	29·2	23·7	22·2	26·4	28·4
Cheshire ....	25	20	28	29·0	30·0	28·0	20·0	28·0	25·5	26·0
Derby .....	—	18	—	29·0	29·0	28·0	20·0	26·0	24·0	24·3
Stafford .....	23	22	28	28·5	29·5	29·9	18·0	19·4	24·0	22·7

TABLE C.—*BARLEY. Estimates of Yield, in Bushels per Acre, at Different Periods, in England and Wales.*

Counties in Groups.	McCulloch, from Board of Agriculture Reports, 1800-16.	Mark Lane Express. 1861.	Royal Commission on Agriculture Reports.		Average of Seven Years, Mark Lane Express. 1876-82.	Inquiry of Farmer and Chamber of Agriculture Journal.	
			Average before	Crop of		Average of Twenty Years, 1863-82.	Crop of
			1878.	1879.		1863-82.	1882.
I. (a.) Cambridge	36	41.0	37.4	26.2	34.7	37.5	41.3
Suffolk ....	22	35.5	37.0	24.4	35.7	36.3	34.6
Essex .....	32	40.0	39.9	24.0	33.0	38.0	37.8
Herts .....	32	35.5	33.0	19.2	30.4	37.0	37.3
Beds .....	32	35.5	32.0	21.0	27.7	33.0	31.4
Hunts .....	40	40.2	37.0	19.0	32.4	35.8	32.9
(b.) Norfolk ....	36	42.7	34.8	25.0	33.8	37.0	37.3
Lincoln ....	32	39.5	37.4	22.4	27.3	34.5	34.7
East Riding	36	39.5	35.0	25.0	—	35.0	30.2
II. (a.) Kent .....	32	40.5	43.0	36.6	36.0	40.6	41.0
Surrey .....	30	35.7	34.1	31.0	31.5	34.5	34.3
Sussex .....	32	41.7	37.0	26.7	28.0	36.4	39.6
Hants .....	30	36.5	34.0	28.3	31.0	32.8	28.7
Berks .....	32	41.7	36.1	25.0	29.3	37.6	33.0
(b.) Notts .....	38	41.7	36.7	27.6	26.4	34.4	33.0
Leicester ....	32	37.7	38.0	19.0	28.0	36.0	32.8
Rutland ....	32	43.2	—	—	34.0	—	—
Northamtn.	32	44.0	37.7	23.0	32.0	37.2	34.5
Warwick ....	28	39.5	34.7	18.4	28.2	31.7	30.0
Oxford ....	28	39.5	35.0	21.6	28.0	35.7	28.7
Bucks .....	32	37.7	28.0	24.0	31.3	36.4	32.0
Middlesex	32	37.5	—	—	39.0	—	—
III. (a.) Shropshire	28	29.0	—	—	21.8	26.6	27.3
Worcester	38	39.2	—	—	34.2	35.0	32.2
Hereford....	30	32.0	24.5	16.0	25.5	33.2	33.6
Gloucester	24	34.5	—	—	31.0	32.2	29.2
Wilts .....	30	36.5	31.0	23.1	31.0	32.5	25.9
Monmouth	28	—	—	—	25.5	28.6	24.6
Somerset ....	28	36.0	37.3	—	33.5	35.1	32.5
Dorset .....	28	38.0	39.3	27.3	31.0	33.7	29.3
Devon .....	24	31.7	30.5	24.7	28.7	30.2	27.4
Cornwall ...	36	31.7	34.6	19.8	25.5	39.0	32.6
IV. (a.) Northum-berland...}	36	35.7	36.1	40.0	27.0	36.0	40.3
Durham ....	33	33.0	30.0	24.7	28.0	34.6	35.0
York, N. R.	36	39.5	36.0	23.0	—	34.7	27.0
„ W. R.	36	39.5	29.0	22.5	—	33.0	32.7
(b.) Cumberlnd.	36	—	36.0	27.0	25.6	35.0	35.4
Westmorlnd.	40	37.0	30.5	27.0	20.0	33.0	29.0
Lancashire	30	39.0	48.0	47.0	36.5	32.0	31.4
Cheshire ....	29	31.5	—	—	30.0	28.3	30.4
Derby .....	36	40.5	34.0	26.0	33.2	32.0	29.3
Stafford ....	36	35.7	36.0	20.0	29.2	30.7	26.0
North Wales .....	32	—	—	22.5	34.0	28.0	27.0
South Wales ...	34	—	30.2	19.1	27.0	27.5	28.0

TABLE D.—OATS. *Estimate of Yield, in Bushels per Acre, at Different Periods, in England and Wales.*

Counties in Groups.	McCulloch, from Board of Agriculture Reports.	Mark Lane Express.	Royal Commission on Agriculture Reports.		Average of Seven years, Mark Lane Express.	Inquiry of Farmer and Chamber of Agriculture Journal.	
			Average before	Crop of		Average of Twenty Years.	Crop of
	1800-16.	1861.	1878.	1879.	1876-82.	1863-82.	1882.
I. (a.) Cambridge	32	59·5	58·0	53·6	48·7	56·6	68·6
Suffolk.....	36	47·0	46·7	43·0	46·0	55·4	48·0
Essex.....	36	51·0	50·8	34·0	44·7	44·7	48·4
Herts.....	36	44·2	42·3	35·0	39·8	47·0	52·6
Beds.....	32	47·7	40·8	32·0	37·8	41·5	37·6
Hunts.....	36	54·2	54·0	38·6	47·3	45·3	45·6
(b.) Norfolk....	40	55·5	56·0	34·0	41·2	51·3	54·9
Lincoln....	48	54·5	51·8	43·3	43·8	49·3	50·8
East Riding	44	51·0	51·0	48·6	—	48·3	49·6
II. (a.) Kent.....	36	53·0	58·3	48·8	45·7	51·0	58·9
Surrey.....	32	42·5	50·0	32·0	47·4	49·0	49·4
Sussex.....	40	51·0	44·6	46·0	37·7	52·0	61·4
Hants.....	32	47·5	45·0	45·5	43·8	40·4	49·2
Berks.....	32	56·0	54·7	54·0	37·7	53·0	56·0
(b.) Notts.....	36	52·0	44·8	37·0	37·0	38·4	42·7
Leicester....	40	47·0	42·2	25·5	38·8	41·8	40·4
Rutland....	44	53·0	—	—	39·8	—	—
Northamtn.	36	53·7	43·0	34·0	38·2	44·6	43·7
Warwick....	40	49·0	—	—	36·0	38·0	40·4
Oxford.....	36	49·7	—	—	38·3	44·8	45·2
Bucks.....	32	48·5	45·3	—	33·3	47·0	44·7
Middlesex	36	57·2	—	—	50·6	—	—
III. (a.) Shropshire	24	31·5	—	—	23·6	29·8	33·2
Worcester	30	44·2	—	—	37·5	—	32·0
Hereford....	32	31·2	—	—	29·8	37·0	40·0
Gloucester	20	40·7	—	—	37·0	41·2	38·7
Wilts.....	32	47·2	44·5	36·0	41·3	43·3	41·5
Monmouth	25	—	—	—	34·7	—	—
Somerset....	32	44·0	—	—	39·2	41·6	43·5
Dorset.....	32	45·0	50·7	44·7	36·7	43·2	40·7
Devon.....	32	37·0	37·0	40·0	41·8	34·6	34·9
Cornwall....	40	37·7	45·0	39·2	30·5	46·6	40·4
IV. (a.) Northum-berland...}	40	40·7	52·8	80·0	30·8	37·2	41·0
Durham....	36	41·0	36·0	34·7	37·5	39·3	41·9
York, N. R.	44	51·0	53·5	43·6	—	47·4	44·0
„ W. R.	44	51·0	39·0	39·0	—	36·1	39·2
(b.) Cumberlnd.	40	—	52·0	39·0	27·4	34·5	37·2
Westmorlnd.	38	34·7	47·5	33·0	37·0	38·0	39·8
Lancashire	40	40·0	51·0	49·3	46·2	47·2	49·0
Cheshire....	36	41·7	44·0	34·0	43·7	34·8	38·6
Derby.....	36	48·0	40·0	24·0	40·6	36·0	36·7
Stafford....	36	40·0	—	—	30·6	37·3	41·7
North Wales.....	38	—	—	36·3	33·7	30·0	33·4
South Wales.....	39	—	35·0	28·0	32·0	37·4	36·4

TABLE E.—SCOTLAND. Yield of Grain Crops, in Counties, in Bushels per Acre, at Different Periods.

Counties.	Wheat.				
	Highland Society's Statistics.	"Farmer" Inquiry.	Highland Society's Reports.	"Farmer and Chamber of Agriculture Journal " Inquiry.	
	1857.	1867.	1881.	1882.	20 Years' Average.
<i>Southern Division—</i>					
Wigtown .....	24	28	18	26	—
Kirkcudbright .....	25	26	—	—	—
Dumfries .....	26	30	—	—	—
Roxburgh .....	26	—	—	—	—
Berwick .....	27	—	30	—	—
Selkirk .....	29	—	—	—	—
Peebles .....	27	—	—	—	—
Lanark .....	37	34	35	35	30
Haddington .....	27	33	36	35	31
Edinburgh .....	30	32	32	36	30
Linlithgow .....	31	—	—	—	—
Stirling .....	28	—	24	38	33
Dumbarton .....	32	31	26	—	—
Renfrew .....	36	26	20	—	—
Ayr .....	29	30	39	—	—
Fife .....	28	26	24	32	32
<i>Northern Division—</i>					
Perth .....	26	24	36	29	29
Kinross .....	26	—	—	—	—
Clackmannan .....	29	20	—	—	—
Forfar .....	27	29	—	37	35
Kincairdine .....	30	—	—	28	29
Aberdeen .....	24	16	—	—	—
Banff .....	23	—	—	—	—
Elgin .....	27	29	24	38	32
Nairn .....	30	—	—	—	—
Inverness .....	24	29	24	28	32
Argyll .....	32	—	—	—	—
Bute .....	30	27	28	32	35
Ross .....	27	30	24	27	26
Sutherland .....	22	—	—	—	—
Caithness .....	28	—	—	—	—
Orkney and Shetland .....	22	—	—	—	—
Barley.					
<i>Southern Division—</i>					
Wigtown .....	31	32	32	31	—
Kirkcudbright .....	30	35	—	36	32
Dumfries .....	29	36	—	40	30
Roxburgh .....	35	—	28	28	30
Berwick .....	33	19	30	—	—
Selkirk .....	36	33	—	—	—
Peebles .....	33	33	32	40	38
Lanark .....	37	—	28	55	31
Haddington .....	38	48	36	37	38
Edinburgh .....	36	36	40	42	42
Linlithgow .....	34	—	14	—	—
Stirling .....	33	—	33	37	38
Dumbarton .....	32	28	28	—	—
Kenfrew .....	36	37	30	—	—
Ayr .....	33	44	44	40	36
Fife .....	32	35	32	35	30
<i>Northern Division—</i>					
Perth .....	31	36	37	35	34
Kinross .....	31	—	—	—	—
Clackmannan .....	35	28	—	—	—
Forfar .....	33	37	48	41	40
Kincairdine .....	34	33	—	38	41
Aberdeen .....	32	36	39	42	36
Banff .....	29	—	32	36	34
Elgin .....	35	37	32	38	32
Nairn .....	32	—	28	—	—
Inverness .....	29	35	36	34	28
Argyll .....	32	30	30	36	36
Bute .....	40	32	36	38	40
Ross .....	33	34	38	28	28
Sutherland .....	29	—	—	—	—
Caithness .....	31	—	32	28	33
Orkney and Shetland .....	31	—	—	40	35

TABLE E.—*SCOTLAND. Yield of Grain Crops, in Counties—Contd.*

Counties.	Oats.				
	Highland Society's Statistics.	"Farmer" Inquiry.	Highland Society's Reports.	"Farmer and Chamber of Agriculture Journal" Inquiry.	
	1857.	1867.	1881.	1882.	20 Years' Average.
<i>Southern Division—</i>					
Wigtown .....	31	40	35	36	—
Kirkcudbright .....	32	51	—	35	32
Dumfries .....	33	42	37	50	35
Roxburgh .....	39	—	29	32	33
Berwick .....	39	50	36	—	—
Selkirk .....	38	38	27	28	25
Peebles .....	32	39	34	44	40
Lanark .....	37	39	43	44	40
Haddington .....	45	53	43	53	48
Edinburgh .....	35	47	50	48	—
Linlithgow .....	34	—	14	—	—
Stirling .....	31	—	40	50	45
Dunbarton .....	35	36	46	—	—
Renfrew .....	37	39	40	36	—
Avr. ....	42	42	50	44	42
Fife .....	37	47	42	45	45
<i>Northern Division—</i>					
Perth .....	35	43	38	39	38
Kinross .....	37	—	—	—	—
Clackmannan .....	38	28	—	—	—
Forfar .....	38	46	48	51	45
Kincardine .....	37	37	—	44	43
Aberdeen .....	33	37	38	40	32
Banff .....	30	—	33	40	38
Elgin .....	32	44	36	40	30
Nairn .....	32	—	28	—	—
Inverness .....	29	43	33	47	41
Argyll .....	35	30	33	33	33
Bute .....	35	37	34	42	44
Ross .....	33	39	32	34	32
Sutherland .....	32	27	—	—	—
Caithness .....	29	40	30	28	30
Orkney and Shetland.....	31	—	32	32	30

TABLE F.—*Yield of Crops in different Geological Areas in England as ascertained by the "Farmer" for the Year 1867.*

Area.		Wheat	Barley.	Oats.	Beans.	Peas.	Pota- toes	Turn- ips.	Swedes.	Man- golds.
I. Drift .....	Marshlands, gravel, &c.	28'0	38'0	50'2	29'5	26'0	4'0	14'7	14'6	23'0
II. Tertiary .....	Crag, sands, clay, &c.	29'3	38'7	53'0	29'1	28'0	6'3	16'2	14'4	20'4
III. Cretaceous ....	Chalk, greensand, &c.	26'5	39'3	53'4	26'8	22'4	10'2	16'1	16'7	21'3
IV. Wealden .....	{Clay, &c., Kent and Sussex .....	21'1	28'2	35'7	24'2	24'4	3'5	10'7	19'4	23'0
V. Oolite & Lias .....	Clays, sand, &c.	23'9	35'6	43'8	25'6	27'1	4'4	17'1	18'4	22'9
VI. Trias .....	New red sandstone, &c.	23'5	33'9	39'2	28'4	23'3	6'2	14'7	15'0	23'3
VII. Permian .....	Lower do. ....	21'9	34'4	40'2	30'0	18'2	4'4	13'2	15'1	18'4
VIII. Carboniferous .....	{Coal measures, lime- stone, &c. ....}	25'9	35'3	42'1	30'5	19'3	5'8	17'1	19'2	18'7
IX. Devonian .....	Old red sandstone, &c.	21'0	29'6	34'8	—	16'0	3'9	18'3	18'6	18'1
X. Silurian and Cambrian .....	Slate and granite .....	22'6	27'2	32'8	25'0	20'0	5'0	13'4	15'4	14'2
Appendix .....	{English Reports re- ceived too late to group .....	27'2	37'0	42'8	28'8	30'8	5'6	14'6	17'6	25'1
Wales .....	—	21'7	28'2	27'9	—	20'0	6'0	16'7	16'7	17'0
Mean of above averages		24'4	33'7	41'2	27'7	22'9	5'3	15'1	16'9	20'0

TABLE G. —*Counties represented in the different Geological Areas of the above Inquiry.*

Counties.	I. Drift.	II. Tertiary.	III. Creta- ceous.	IV. Weal- den.	V. Oolite and Lias.	VI. Trias.	VII. Per- man.	VIII. Carbon- iferous.	IX. Devonian.	X. Silurian and Cambrian.	Mean of County.
Cambs .....	30	—	29	—	—	—	—	—	—	—	29'5
Suffolk .....	—	29	26	—	—	—	—	—	—	—	27'5
Essex .....	—	30	—	—	—	—	—	—	—	—	30'0
Herts .....	—	—	26	—	—	—	—	—	—	—	26'0
Beds .....	—	—	—	—	30	—	—	—	—	—	30'0
Hunts .....	—	—	—	—	24	—	—	—	—	—	24'0
Norfolk .....	33	32	28	—	—	—	—	—	—	—	31'0
Lincoln .....	30	—	26	—	26	—	—	—	—	—	27'3
York (E. Riding) .....	—	—	—	—	—	—	—	—	—	—	—
Kent .....	—	30	27	20	—	—	—	—	—	—	25'7
Surrey .....	—	33	—	—	—	—	—	—	—	—	33'0
Sussex .....	—	32	—	21	—	—	—	—	—	—	26'5
Hants .....	—	20	—	—	—	—	—	—	—	—	20'0
Berks .....	—	—	24	—	27	—	—	—	—	—	25'5
Notts .....	—	—	—	—	—	22	—	—	—	—	22'0
Leicester .....	—	—	—	—	—	32	—	30	—	—	31'0
Rutland .....	—	—	—	—	20	—	—	—	—	—	20'0
Northampton .....	—	—	—	—	24	—	—	—	—	—	24'0
Warwick .....	—	—	—	—	—	26	—	—	—	—	26'0
Oxford .....	—	—	—	—	23	—	—	—	—	—	23'0
Bucks .....	—	—	28	—	23	—	—	—	—	—	25'5
Middlesex .....	—	—	—	—	—	—	—	—	—	—	—
Shropshire .....	—	—	—	—	—	—	23	—	—	—	23'0
Worcester .....	—	—	—	—	24	27	—	18	—	—	23'0
Hereford .....	—	—	—	—	—	—	—	—	21	25	23'0
Gloucester .....	—	—	—	—	22	—	—	—	—	—	22'0
Wilts .....	—	—	16	—	—	—	—	—	—	—	16'0
Monmouth .....	—	—	—	—	—	—	—	—	—	—	—
Somerset .....	—	—	—	—	25	—	—	—	—	—	25'0
Dorset .....	—	—	24	—	24	—	—	—	—	—	24'0
Devon .....	—	—	—	—	17	18	16	20	20	19	18'3
Cornwall .....	—	—	—	—	—	—	—	—	17	—	17'0
Northumberland .....	—	—	—	—	—	—	—	28	—	—	28'0
Durham .....	—	—	—	—	—	24	23	21	—	—	22'7
York (N. Riding) .....	—	—	—	—	20	22	—	—	—	—	21'0
York (W. Riding) .....	22	—	—	—	—	22	24	32	—	—	26'0
Cumberland .....	—	—	—	—	—	25	—	26	—	—	24'0
Westmorland .....	—	—	—	—	—	18	15	—	—	—	16'5
Lancashire .....	25	—	—	—	—	30	—	27	36	—	34'5
Cheshire .....	—	—	—	—	—	—	—	37	—	—	37'0
Derby .....	—	—	—	—	—	—	24	—	—	—	24'0
Stafford .....	—	—	—	—	—	25	—	18	—	—	21'6
Mean of Geological Areas .....	28	29'4	25'4	20'5	23'5	24'3	20'8	25'7	23'5	22	—

*Note.*—The means of the several geological districts when worked out as in this table, on the average of the counties named as furnishing reports in each class, will not exactly agree with the means as worked out in the foregoing table, in which an average of the whole reports from each geological area is striking. The arithmetical mean of the ten areas thus averaged stands at 24'3 as against 24'4 in the other table. To the mean of each county no great importance can be attached, as the number of reports in many cases is insufficient.

TABLE H.—*Showing the (1) Total Cultivated Area; (2) the Total Acreage of all Corn Crops, and of Wheat, Barley, and Oats in each County in England, on the Average of the Ten Years 1872-81.*

	Total Cultivated Area.	Total Corn Crops.	Wheat.	Barley.	Oats.
	Acres.	Acres.	Acres.	Acres.	Acres.
England .....	24,253,999	7,304,558	3,006,716	2,030,143	1,466,677
Wales .....	2,715,858	505,440	104,373	152,479	240,049
Scotland .....	4,649,925	1,409,699	93,962	262,101	1,018,151
Total—Great Britain	31,619,782	9,219,697	3,205,052	2,444,723	2,724,877
Bedford .....	258,242	115,136	50,376	32,089	10,170
Berks .....	372,053	146,885	59,376	39,612	26,977
Bucks. ....	402,056	132,450	54,613	29,769	25,772
Cambs. ....	482,946	257,615	125,079	64,173	34,495
Chester .....	525,589	82,613	27,849	3,293	45,959
Cornwall .....	532,391	143,820	47,369	52,197	44,031
Cumberland .....	556,030	97,119	18,565	7,989	69,505
Derby .....	504,682	70,293	26,695	14,063	26,855
Devon .....	1,107,665	287,867	118,330	75,385	90,957
Dorset .....	478,149	111,875	42,643	39,394	22,108
Durham .....	411,379	93,269	34,010	19,466	35,442
Essex .....	824,151	404,127	177,390	113,697	39,823
Gloucester .....	647,783	172,062	87,550	42,403	18,477
Hants.....	701,673	253,406	105,231	62,667	66,804
Hereford.....	437,440	106,766	55,476	22,833	12,971
Herts.....	337,223	147,029	61,353	46,114	25,697
Hunts.....	208,881	99,280	44,948	25,064	11,653
Kent .....	733,262	239,137	100,283	46,092	51,098
Lancaster .....	765,098	101,196	30,779	10,113	53,799
Leicester .....	470,175	104,770	39,729	31,925	21,498
Lincoln .....	1,478,740	622,079	281,771	184,060	97,525
Middlesex .....	116,590	18,759	8,043	2,448	4,903
Monmouth .....	233,640	38,387	18,018	10,260	8,223
Norfolk .....	1,072,075	451,806	194,407	194,704	29,596
Northampton .....	557,049	179,265	74,973	57,219	20,079
Northumberland ....	688,761	134,914	28,191	40,231	59,637
Notts. ....	446,452	157,863	68,121	49,467	21,613
Oxford .....	414,968	163,938	59,808	54,061	25,267
Rutland .....	85,644	26,275	9,216	11,195	3,711
Salop .....	698,399	168,722	77,623	53,462	26,434
Somerset .....	837,391	142,547	69,180	33,617	22,029
Stafford .....	594,336	115,258	49,156	28,884	29,639
Suffolk .....	768,869	382,810	146,791	147,883	15,239
Surrey .....	298,402	95,472	41,039	17,401	25,780
Sussex .....	659,722	204,651	94,465	22,600	65,608
Warwick .....	486,318	142,693	68,603	27,790	16,744
Westmorland .....	241,149	20,257	1,381	2,641	16,010
Wilts .....	745,836	217,833	92,602	67,230	36,011
Worcester .....	393,984	118,317	61,558	19,990	8,445
Yorks., E. Riding ....	670,554	278,514	103,715	73,056	76,734
„ N. Riding ....	831,276	220,199	61,399	77,332	67,154
„ W. Riding.....	1,176,903	237,860	88,617	76,108	56,706

TABLE I.—*Percentage of Cultivated Area occupied on the average of the Ten Years 1872-81, by—*

	Corn Crops.	Wheat.	Barley.	Oats.	Rye. Beans. Peas.
England .....	30'12	12'4	8'37	6'05	3'30
Wales .....	18'61	3'85	5'61	8'84	0'31
Scotland .....	30'31	2'02	5'63	21'90	0'76
Total—Great Britain .....	29'16	10'14	7'73	8'61	2'68
Bedford .....	44'58	19'50	12'42	3'93	8'70
Berks .....	39'34	15'96	10'65	7'25	5'48
Bucks.....	32'94	13'58	7'40	6'41	5'55
Cambs. ....	53'34	25'90	13'29	7'14	1'05
Chester .....	15'72	5'30	0'63	8'74	7'01
Cornwall.....	27'01	8'90	9'80	8'27	0'04
Cumberland .....	17'46	3'34	1'43	12'50	0'19
Derby .....	13'93	5'29	2'79	5'32	0'53
Devon .....	25'99	10'68	6'81	8'21	0'29
Dorset .....	23'40	8'92	8'24	4'62	1'62
Durham .....	22'70	8'27	4'73	8'62	1'08
Essex .....	49'04	21'52	13'80	4'83	8'89
Gloucester .....	26'56	13'51	6'55	2'85	3'65
Hants .....	36'11	15'00	8'93	9'52	2'66
Hereford.....	24'40	12'68	5'22	2'96	3'54
Herts .....	43'60	18'20	13'67	7'62	4'11
Hunts.....	47'53	21'52	12'00	5'58	8'43
Kent .....	32'61	13'67	6'29	6'97	5'68
Lancaster .....	13'22	4'01	1'32	7'03	0'86
Leicester.....	22'28	8'45	6'79	4'57	2'47
Lincoln .....	42'07	19'05	12'45	6'60	3'97
Middlesex .....	16'10	6'90	2'10	4'20	2'90
Monmouth .....	16'43	7'71	4'39	3'52	0'81
Norfolk .....	42'14	18'14	18'16	2'76	3'08
Northampton .....	32'17	13'46	10'27	3'60	4'85
Northumberland .....	19'60	4'10	5'84	8'65	0'56
Notts. ....	35'36	15'26	11'08	4'84	4'18
Oxford .....	39'50	14'43	13'03	6'09	5'95
Rutland .....	30'68	10'76	13'07	4'34	2'51
Salop .....	24'16	11'12	7'66	3'78	1'66
Somerset.....	17'02	8'26	4'01	2'63	2'12
Stafford .....	19'40	8'27	4'86	5'00	1'28
Suffolk .....	49'79	19'10	19'23	1'98	9'48
Surrey .....	32'00	13'75	5'83	8'64	3'78
Sussex .....	31'02	14'31	3'42	9'95	3'34
Warwick.....	29'34	14'11	5'71	3'44	6'08
Westmorland .....	8'40	5'6	1'10	6'64	0'10
Wilts .....	29'20	12'41	9'01	4'83	2'95
Worcester .....	30'03	15'63	5'07	2'14	7'19
Yorks., E. Riding .....	41'53	15'47	10'89	11'44	3'73
„ N. Riding .....	26'49	7'39	9'30	8'08	1'72
„ W. Riding.....	20'21	7'53	6'47	4'81	1'39



DISCUSSION *on* MAJOR CRAIGIE'S PAPER.

MR. W. J. HARRIS said he was glad that Major Craigie had referred to the estimate of the value of British agricultural produce made by Sir James Caird for the Royal Agricultural Society in 1878, and he wished that Major Craigie had found time to have supplemented his most valuable paper with a fresh estimate of his own making. Although he considered that the individual items were pretty correctly valued at the time by Sir James Caird, yet he regarded them as giving a result wanting in correctness when taken collectively. Major Craigie had hinted that the results of Sir J. Caird's calculations did not agree with his own, and it must be evident to all that it was a most incorrect plan to take the value of each agricultural product alone, and then to add them all together, without considering what became of the different articles before they were ultimately sold. Agriculture was in truth a manufacture, and before meat could be produced a certain number of other articles must be used to produce it. And not only were large quantities of our own corn and hay crops used for this purpose, but also a number of foreign materials were bought by farmers and used in like manner. None of these things had been taken into account by Sir J. Caird, but he had just valued the total quantity of meat sold as being the production of our own soil. He must admit that there were likewise some items on the other side which Sir J. Caird might properly have added to his estimate. Major Craigie had already mentioned poultry as one of these omissions, and the number of horses which our farmers sold every year for non-agricultural purposes must be taken as another. He believed that this latter amount might be approximately arrived at by taking the number of non-agricultural horses existing in the United Kingdom, and giving them an average life of about seven years from the date of their purchase. If this estimate of their average life were correct, the number sold could be easily arrived at, and he imagined it would exceed 100,000—worth, possibly, 4 million pounds. As to the horses used in agriculture, they could not be reckoned as any gain, as they were necessary to the business, and their purchase or breeding and keep formed part of the expenses of agriculture. The only reliable estimate of the produce of British agriculture would be derived from what the farmers actually had for sale. The total estimate of Sir James Caird amounted to 260 million pounds for the three kingdoms, but judging by the Gazette returns it was evident that farmers had very few oats for sale. It was, therefore, quite evident that the oat crop could not be valued as an asset at one-fifth part of its produce. The same observation would apply to barley. He did not believe that more than half the barley crop was sold, or that more than four-fifths of the potato crop was sold. He very much doubted whether the total

production of the United Kingdom was so much as 200 million pounds, or for England and Wales alone more than 140 million pounds. Taking this latter figure as the production of England and Wales alone, would give us the means of ascertaining pretty correctly the proportion which the burdens of agriculture bore to what the agriculturist had to sell. Including tithes, imperial taxation, and local rates, the burdens on agriculture in England and Wales amounted to about 14 million pounds per annum, or about 10 per cent. on the receipts. It therefore appeared to him that notwithstanding our system of free trade which many so much admired, we were in fact protectionists against ourselves in the matter of agriculture. It was maintained by some that tithes were a charge on the landowner, and so they might be now, but it was not so before the repeal of the corn laws. Before the commutation in 1836, if anyone took a piece of uncultivated land, there was no tithe belonging to it at all, but directly he cultivated it he was tithed according to the produce, and in selling the produce he had to calculate the tithe and all other burdens as part of the cost. Since the repeal of the corn laws, all these charges had been gradually transferred from the consumer to the producer. Before then prices would be fixed by the process of competition of farmers among themselves; but since then the price had been fixed by competition with the American farmers, who had no tithes and very small taxes to pay; therefore Englishmen were handicapped to this extent. Moreover, the American agriculturist farmed with a view to exhaust his soil, and then move on, but land here was farmed with a view to maintain its fertility. As Major Craigie told us, the yield of corn per acre at the commencement of this century was less than now, which showed conclusively that it had been managed on principles which maintained its producing value. Mr. Chamberlain had admitted that agriculture was our most important manufacturing industry. As a natural sequence he must admit that the land was the raw material, and it seemed quite absurd with the free trade notions which were generally held here that the raw material should be taxed at all. It was said that all abatements would go to the landlords; but he thought this an unreasonable supposition, unless it could be proved that agriculture was in a very prosperous state, and then probably landlords might be able to gain some benefit from the remission of taxes. As it was, the labourers and tenants would both claim to live differently to what they had done in the past before the landlord would receive any benefit. Rent simply meant the interest of money laid out in buildings, draining, fencing, and other operations with a certain prairie value added, which varied with the quality of the land. He knew of hundreds of farms which could not now be produced at to-day's price of labour for the capitalised value of the rent, let alone any value for the land itself. A month or two since a farm of nearly 500 acres, situated in the West of England (which he knew very well), was sold at four and three quarter times the tithe multiplied by thirty years' purchase. In 1842 the same farm had been sold for seven times the tithe multiplied by thirty years' purchase. Soon after 1842 the rent had been raised

to eight times the tithe. The farm had been tenanted by one family for over one hundred years. In 1879 their lease came to an end, and they left the farm, and it had recently been sold at the very low price he had mentioned. This showed how very unfairly a fixed charge fell on land. He did not wish to argue against the Established Church receiving her legal revenues, but he could not see why this one industry should bear the brunt of it. Foreign competition had only gradually produced these results, firstly, the Crimean war had interfered with Russian supplies, and, secondly, the American civil war had prevented the full development of their productive forces for many years; but now the competition was upon us in all its force for corn, and he ventured to predict that before long it would be equally severe in regard to meat, or perhaps more so. Looking at results for the last twenty years, it would be interesting to note the decline in prices. Thus in 1860-62, the average price of wheat was 54s. 10d.; of barley, 33s. 5d.; and of oats, 23s. 7d.; while for the three years comprised in 1880-82, the average prices were as follows:—wheat, 44s. 11d.; barley, 32s. 1d.; and oats, 22s. 3d.: so that there had been a very important decline in all three articles, showing that the burdens on agriculture had been shifted from the consumer to the producer. He maintained that prosperity would not return to agriculture until there was an entire revolution in the incidence of taxation. It had been recommended that farmers should turn their land into pasture, but however much landlords might think this to their own interests, he believed that such a proceeding was bad for the country, as it reduced by one-half our producing power; and moreover, when poor land was treated in this way, it was apt to increase the tendency to liver fluke among the sheep pastured upon it. This disease, as all knew, had been a great scourge for many years past.

Mr. CLARE SEWELL READ said the previous speaker had quite astonished him by the doctrines which he had advanced, which savoured more of a farmer's club than this learned Society. He considered that free trade had nothing whatever to do with the alteration of the tithes, which were commuted some twelve or fourteen years previously. If legitimate estimates of the yield of grain and the produce of meat and wool could be obtained, they would be exceedingly useful. Suppose he (Mr. Read) grew on an average 200 acres of wheat a year. In the year 1874 he had 6 quarters an acre all round; in the years 1879 to 1881 the produce was only  $3\frac{1}{2}$  quarters. In some exceptional years he might increase the quantity by 30 acres or decrease it by 30 acres, and the result between the greatest amount of acreage, estimating the average yield at 4 quarters, and the smallest amount of acreage, would be something like 240 quarters, whereas the difference between a very good crop and a very bad crop, even in a light land county, would be something like 500 quarters. A good reliable estimate of the yield was therefore really a matter of more importance than the variety of area under crops in different years. What had been said by the last speaker with regard to the produce of arable as com-

pared with pasture land, referred more to the eastern and corn growing districts than to the western and some of the midland districts. No doubt in Norfolk an acre of arable land would yield double the quantity of produce than an acre of grass land would do, but at the same time if the farmers there found it more profitable to produce the lesser quantity, the country had no business to say to them, "You ought to grow corn;" they must grow what they could sell, even if it was a loss to the nation, provided it was the best thing for themselves. It was generally supposed that acreage statistics were very accurate, and he believed they were fairly so, but from a rather extensive knowledge of the collection of such statistics in a district where there was a great number of small farmers, he could say that the difference in the way in which farmers filled up the returns was somewhat remarkable. A good many guesses were made at the acreage of corn and other crops, and there were different methods of calculation adopted even by people who were supposed to know much better. For instance, he had known farmers go to the schedule which was generally attached to the lease, take the number of acres of the different fields, add them up, and say, "There is so much wheat and so much barley," forgetting the fact that in all probability that acreage represented, in small enclosures, from 10 to 15 per cent. more than the actual acreage that was under crops in consequence of roads, fences, and ditches, being included, and so on. On the other hand, some small farmers would take their fields of 10, 6, and 4 acres, add them together, and make them 20 acres, whereas in all probability if the different quantities had been accurately ascertained, the 10, 6, and 4 acres would make 21 or even 22 acres. There was therefore a difficulty at arriving at an exact acreage. He hoped that that would be gradually overcome by a more intelligent view being taken by farmers in making up their returns. It was quite true that a check had been given to the advance of production by the unremunerative crops of the last few years. Up to 1870 or 1874 agriculture prospered pretty fairly, but since then the country had passed through such a period of depression that the average yield was greatly diminished, and he feared that it would continue to diminish. Good seasons would no doubt come again, but farmers might not be in a position to take advantage of them. The land was not now in a state to produce its former good crops. The farming interest was now so poor and the land so foul, that come what may, no very great crop of corn could be grown in England for many years to come.

Mr. S. B. L. DRUCE joined with Major Craigie in expressing his regret that the statistical information which the Royal Commission had afforded was not more complete and comprehensive than it is. So far as the Assistant Commissioners for England, of whom he was one, were concerned, they met together and arranged two tables, by the first of which they hoped to obtain accurate statistical information of the average production of wheat, barley, oats, peas, beans, hay, straw, roots, including potatoes, flax, and hops. By the second table they hoped to obtain the cost of the production of each crop. He was happy to say that from some parts of his district, which

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comprised fifteen eastern and eastern-midland counties, he received very complete and accurate returns, but the whole of them were not printed in the reports, and therefore the statistical results of the inquiry were not so comprehensive as they might have been. When Major Craigie showed him the returns he had taken out from the published reports he (the speaker) was astonished, and saw at once that the results were wrong as applied to several of his counties. He immediately applied himself to the inspection of his manuscript returns, and he found that many of them had not been printed in the published reports. From the largest county included in his district, namely Lincolnshire, he received a great number of returns both of the production of the crops and of the cost of their production. From Suffolk and Cambridge he also had a fair number, but from Derbyshire he had only about four returns. The difficulty lay in getting the returns from the smaller farmers. Now-a-days the large farmers conducted their farms as men of business conducted their businesses. Some of them kept not only good books and good accounts, but a clerk or a well instructed bailiff or assistant to do the tabulating for them; but an ordinary farmer, who was often not very well educated, and who was out in the fields all day long, was too tired at night to make the returns, and perhaps scarcely able to make them, however simple they might be. Even within the last year or two farmers had said to him, "What is the good of making returns; they do no good to me?" and others had said, "It is only a dodge to put up our rents, or to raise the taxes and rates." In this respect, however, he thought matters were decidedly improving, but still too much reliance must not be placed on the agricultural returns for some years to come.

Mr. EDMUND J. MOFFAT, European agent of the United States Department of Agriculture, said that in America, where the prices were affected by dealings in "futures" and by "corners," it was most important that accurate agricultural returns should be obtained. For that purpose the Government some years ago established an Agricultural Bureau of Statistics. The work had progressed slowly, but year by year Congress saw the necessity of it, and last year an appropriation of 16,000*l.* was given towards it. The States were accurately mapped out; every correspondent in a particular county was known, and so they knew to whom to apply for every information that was required. The reports were made monthly, printed slips being sent out to the correspondents containing minute directions as to how to proceed with regard to particular crops in the neighbourhoods. They now had 3,000 correspondents, and for special crops like cotton, probably 400 or 500 made their report regularly on a particular day. When the reports were received, a large number of skilled clerks at once digested their contents, which were afterwards published. Of course they claimed no nearer approach to accuracy in these matters than could be secured anywhere else with the same amount of care and labour. For his own part he never believed that statistics were specially accurate simply because they happened to be baptised "official."

Mr. CLARE SEWELL READ asked if the correspondents were remunerated in any way in the United States.

Mr. MOFFAT said they received seeds from the experimental farms and all the agricultural publications of the Government. The only correspondents paid were the lately appointed special State agents.

Mr. H. MONCREIFF PAUL, before making any comments on the interesting paper which Major Craigie had read, desired to offer a few observations on the remarks which had fallen from his friend Mr. Harris. The freight and charges on shipments of wheat from other countries to England were a sufficient protection to British farmers without levying any duties on imported wheats. The exhaustion of the soil to which allusion had been made was a natural consequence in all new countries of overtaking the powers of virgin soil, which was too frequently regarded as being practically inexhaustible. The production of wheat in Russia had not permanently declined since the Crimean war, it simply ebbed and flowed like that of other countries. In proof of this it might be stated that while in the year 1878 wheat and wheat flour to the extent of 2,084,522 quarters were imported from Russia into Great Britain; in 1882 there were 2,208,699 quarters; but midway between 1878 and 1882 the importations dropped to 664,640 quarters. Mr. Harris had remarked that the burden of taxation had been shifted in England from the consumers to the producers in consequence of the adoption of free trade; but the fact was that the producers were themselves consumers of a great many articles which in consequence of free trade they could obtain at lower prices in common with the other inhabitants of the country; so that while they appeared to lose with the left hand they gained much more with the right. He did not agree with Mr. Harris that the turning of arable into pasture land was the cause of an increase of disease among sheep. Fluke and kindred diseases depended first on the geological formation, and secondly upon the seasons. If the geological formation were such as to produce a saline soil there would be no disease. As a practical instance, he might add that on much of the pastoral land in Australia sheep had been kept constantly on it for years and years without any sign of disease, whether the season was wet or dry. Having regard to the reason assigned by Major Craigie for his inability to complete the various sections of his paper, it would not be fair to criticise it too closely. Turning however to what had been said about the records in the colonies of agricultural and pastoral statistics, he would simply say that in such cases the statistics were freely given; they were regarded as an advertisement of what could be done there, and therefore there was no reticence on the part of farmers in giving the returns. Besides this, in many of the Australian colonies a tax was laid upon the occupiers or tenants of Government lands in proportion to the stock it carried, and therefore of necessity stock returns must be made year by year by the squatters. He thought Major Craigie was perfectly right in the remarks he made when dealing with the relative importance

of wheat as compared with other cereals. Where in Great Britain wheat was chiefly grown, it was because the climatic influences were there most favourable. In many places in Scotland where wheat was formerly cultivated it was not grown now because it does not pay, and it was found much more profitable to give attention to other crops. The higher the latitude at which wheat could be grown the better, provided there was plenty of sun and not too much rain, and this position was justly established in the diagrams exhibited that evening. He had gathered some independent statistics from various sources with regard to British wool, and he found that his figures were very much in accord with those of Major Craigie. His calculation was that the home clip of wool in the year 1876 was 155,800,000 lbs., the product of 28,182,951 sheep, or an average of 5.52 lbs. per head clipped. In 1882 130 million lbs. were clipped from 24,318,778 sheep, or an average of rather less than 5.34 lbs. per head. Thus in seven years the home clip had decreased 25,800,000 lbs., and the sheep nearly 4 millions. The peculiarity with regard to this result was that while there had been a decrease in the clip, there had been an actual increase in the exports of the home wool during the period under review. Thus in the year 1876, according to the customs returns, the exports were 9,823,176 lbs., while in 1882 they were 13,879,200 lbs., or an increase of 4,056,024 lbs. This increase was caused by the continued depression of trade in the Bradford district, in consequence of which the domestic wool had been taken more freely by foreign manufacturers. In treating of foreign produce statistics, Major Craigie had not dealt with colonial statistics, but he would commend to his notice Mr. Hayter's "Statistical Handbook of Victoria," in which were included those relating to the other Australian colonies and New Zealand. Those colonies had in 1881 74 million sheep, and 7 million acres of land under cultivation, of which 3,392,000 acres were under wheat, producing nearly 4 million quarters, and were therefore, he thought, entitled to find a place in the paper before it became incorporated in the *Journal* of the Society.

Mr. S. BOURNE said it was impossible to overestimate the advantage of these statistics, even though they were not absolutely accurate. The great value of such information was comparative, and though any particular year might not be exactly correct, yet unless there was reason to suppose that the other years with which it was compared varied in the extent of inaccuracy, the value of the statistics was exceedingly great. Still, the proper course was not to resist improvements, because they rendered comparison difficult, but to make allowances for inaccuracies when dealing with the facts brought before them. He trusted that Major Craigie's paper, coupled with the remarks as to the appointment of a minister of agriculture, would have some effect in increasing the amount of information upon the points dealt with in the paper. England had now no alternative but to go on with free trade, because with such a growing population an increased amount of food was required, and if it was not grown at home it must be obtained from abroad. The increased population could not be

profitably employed in the cultivation of the soil, and if retained in the country at all they must engage in the manufacture of articles to be sold abroad. The imports of foreign food during the past year compared with those of last year, showed some facts which bore very much on the importance of obtaining information with regard to what was taking place at home. The importation of the principal articles of animal food in the last year amounted to 44 million pounds in value, which was 3,500,000*l.* below the importation of the previous year. This bore out the argument that there was a difficulty in the importation of meat from abroad, which drove the agriculturist at home to the production of meat. If such a production was more profitable to the agriculturist than corn, it could not be injurious to the prosperity of the country. Concurrently with the diminution of the value of imported food there had been an increase in the cost of it; so that the real diminution, if estimated according to the quantity, was fully equal to 10 per cent. Side by side with that there had been an increase of 5 million pounds in the importation of vegetable food, or an increase of 5 per cent. No doubt this arose in a great measure from the deficiency in the American crop of Indian corn. That also explained the great increase in the production of barley and oats, which supplied the place of Indian corn in feeding stock.

Mr. STEWART (J.P. for Banffshire) said that he owned a moderate extent of land in one of the northern states of America, the ploughing alone of which was easier than that of most grass land in England, giving the American farmer a great advantage over his English competitor, even though the question of taxation was entirely left out. But under the head of taxation the British farmer was most severely handicapped, for the land burdens were excessively heavy. As regards freights, it was a remarkable circumstance that within a few miles of a railway station in Kent there was a considerable district of good wheat land, but the charges for carrying the wheat to the London market were actually greater than those to bring the wheat from Chicago. When the incidence of taxation on land was spoken of, it should be remembered that when heavy burdens were put on a fertile district in a rich parish they did not form a very large amount, proportionately, of the rental or produce of that parish; but in the poorer districts of Scotland they were enormous, and had the effect of driving the land out of arable cultivation into grass, which was neither good for the employment of the labouring classes nor for the general production of the country. A large rate on a poor district fell with crushing severity, while in a rich district it was a comparatively trifling matter. Two-fifths of the farmers of Haddingtonshire had migrated to Ireland in the last few years, and Lord Elcho had stated that in one parish the school rates alone were something like 1*s.* 10*d.* in the pound, while in another parish in the same county they only amounted to a few pence. It was a rich parish in which those rates were small, and a poor parish in which they were heavy. The confusion about tithes being or not being a burden on the land arose from the fact that people made too many



distinctions between occupier and landowner. In his opinion, it was the cost of the produce which was enhanced by these burdens, so that that question did not enter into the matter. Even supposing there were no tenant farmers at all, whatever the theory might be, practically, if a man could grow wheat at 40s. a quarter and his tithe was 1*l.* per acre, it was perfectly certain that if that burden were removed or equalised he could grow the wheat at a corresponding reduction. He had been greatly disappointed by the return from investments in land improvements, and he remembered the late Mr. McCombie saying it might have been well for Aberdeenshire in these days if it had not been so much "improved." The outlay thus incurred had been unremunerative, and resulted in heavy losses.

Mr. WALFORD considered that the time had now arrived when the word "grain" should be used instead of "corn." The latter word had now come to have a distinct meaning, viz., Indian corn, and great confusion sometimes arose from the more general use of the word. Grain comprehended all cereals, and was a better word. He would defer at that late hour some other observations he had intended to make, merely remarking that in the United States he had always found amongst the farmers an intelligent appreciation of the uses of statistics.

The PRESIDENT, in proposing a vote of thanks to Major Craigie, said there could be no doubt whatever of the extreme value of the results that gentleman had placed before the Society. Students of the subject had now got the materials in a very compact shape, and no doubt for many years to come the paper would be referred to by investigators. He wished to echo what Mr. Druce and Major Craigie had said when they expressed their regret that the Royal Commission on Agriculture had not made a fuller use of the statistical materials which were placed before them. Considering what the assistant commissioners had done, something ought to have been done in the way of giving a summary of the results as to what the normal production of agriculture in this country was, and, as far as possible, the deterioration which had taken place in the years of depression. The materials existed, and it would have been worth while to spend a good deal of money in working them up. Mr. Sewell Read made some remarks upon the comparative value of returns of produce as compared with returns of acreage, which were extremely important, and ought to be very carefully considered. Some foreign countries thought that a census of agriculture at distant periods, supplemented by returns of produce, was the most convenient way of taking agricultural statistics; but in this country, the authorities who were instrumental in having such statistics introduced thought it extremely important that they should first of all, and principally, get a return of the acreage. In their view that was the most important point, because many grain merchants had been accustomed to make estimates of produce which were more or less trustworthy, and it was thought that if the Government would supplement those estimates by a census of

the acreage, the information would be complete. He believed that to some extent that view was correct. Of course he did not say a word against obtaining a return of the produce itself, but simply wished to point out that that was the history of the subject, and that whatever opinion might be held as to the relative value of returns of produce and returns of acreage, yet the returns of acreage had satisfied a very important demand. A good many conveniences had been found in having an annual census of the acreage. To a certain extent the data in this country for obtaining both official and unofficial estimates of products were, perhaps, better than in any other country. The fact that it was taken annually enabled a check to be applied. Though there might be a margin of error in any particular year, yet if the figures for different years were drawn from the same sources, the comparison for a series of years might be almost mathematically accurate to all intents and purposes. With reference to the estimate as to the loss by the agricultural depression that he himself made about eighteen months ago, he wished to point out that the figures he then brought forward were not his estimate of the loss which had occurred to the agricultural interest. His object distinctly was to bring before those interested in the subject a mode of calculation which would help to check their own returns, and he did not put forward the result as a complete one. It was simply the result of the calculation which he followed to which he believed great value was to be attached, but which was only to be used to corroborate or confirm other estimates. In these matters the utmost good faith should be observed. Different methods should be taken; the results should all be put together, then analysed and compared; and so a good result might be obtained. Mr. Harris had argued that Sir James Caird's estimate of the annual production was much too high; but if they followed out the method of calculation which he (Mr. Giffen) used they would find that the 200 million pounds which Mr. Harris had referred to would give, allowing for the imports, between 8*l.* and 9*l.* per head as the consumption of this country. If those figures were worked out, it would be seen that the apparent depression, the diminution of production in the bad years compared with the good times before, was so great as to be almost incredible. Mr. Harris should therefore revise his own figures and consider what they implied. A great deal had been said about the taxation on agricultural interests. The subject was not strictly included in that under discussion; but as it had been raised, he might be allowed to say (and in this all political economists would agree with him) that the greater part at least of the so-called burdens on agriculture were in no way burdens on the cultivating interest. They were a mere distribution of the profit. If there was no profit in farming there would be no rent and no rates, and the payment of rent and rates was simply a distribution of the profit. With regard to the statement that American taxes were much less than in this country, he must say, from all the information he had upon the subject, that the American taxation upon property, including that of land, was very much heavier indeed than in this country. The taxation in England was comparatively light, but the local taxation in America was very heavy.

Major CRAIGIE (in reply) thanked the Society for their kindness in passing a vote of thanks to him. The President, he said, had warned them against running off into side issues—such as the relative amount of the burdens on land, a matter which only indirectly concerned a paper on records of production, and had pointed out that these burdens did not fall, theoretically at least, on the cultivators; but in his paper he (Major Craigie) had used the term “capital invested in agriculture,” and he was of opinion that it could be proved to demonstration that the present taxation falling on the agricultural interest as a whole, did unduly and unequally affect the capital belonging both to the tenants and to the landlords employed in the cultivation of the soil. If this was over taxed, surely cultivation must be affected in some way. In reference to the calculation made of diminished production as determined by increased food imports, in comparing the amount to be allowed for the increase of population, the question of the head rate of consumption was a cardinal feature. Now, in his evidence before the Royal Commission, Sir James Caird gave 9*l.* 5*s.* 6*d.* as the total consumption per head, while Mr. Giffen based his figures on 12*l.* per head. The difference was very considerable, but he had not yet learned on what ground the two calculations differed so largely.

The PRESIDENT said his impression was that Sir James Caird did not allow for the consumption by cattle in the 9*l.* per head, whereas the 12*l.* per head was the total consumption of agricultural products, no matter how consumed.

Major CRAIGIE said that Mr. Bourne did not appear to have quite caught the force of the tables given in the paper with regard to barley. During the past few years the production was under the average, and when compared with Sir James Caird's figures, it would be seen to be decidedly less. During the last few days he had had a correspondence with Sir J. B. Lawes, who had put his estimate of the production of barley under that given in the paper. They had also had much more bad and discoloured barley in proportion of late years than they had ever had before, and that had greatly reduced the price obtained for this product. They therefore could not rely on barley to make up for the loss of wheat. Oats, however, had better withstood the climatic influences to which the other grains had succumbed. During the past year however there certainly had been a fairly luxuriant crop of oats. He hoped that some statisticians who had time to spare would make profitable use of the figures given in the paper and carry them further, if so he trusted his tables would form the basis of future discussions of considerable interest.

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