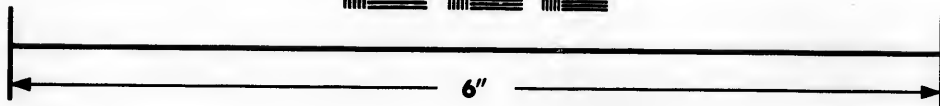
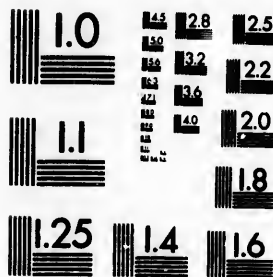


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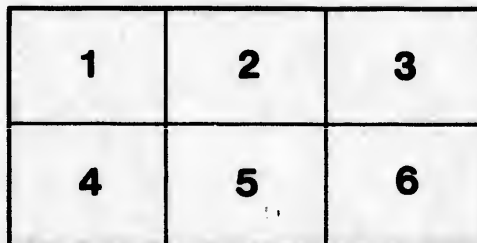
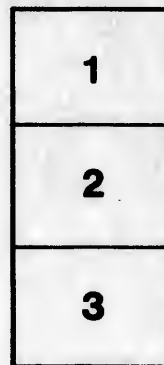
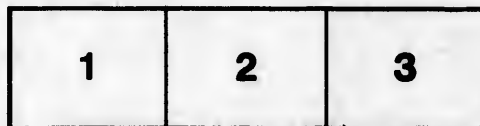
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1896.

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(An Address before the Political Science Club of Toronto University.)

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POLITICAL AND SOCIAL ARITHMETIC.

AN ADDRESS BEFORE THE POLITICAL SCIENCE CLUB OF TORONTO UNIVERSITY,
ON FEBRUARY 3rd 1898.

To-day, in America, the currency problem, the question of the tariff, and the riddle of the exchanges are arousing public sentiment to a keen appreciation of a knowledge of economic and of social facts. And not alone in federal, but also in local circles the demand is becoming ever stronger for reliable and complete official returns. As early as 1874, the late well-known American Economist and Statistician, General Walker, wrote: "The country is hungry for information; everything of a statistical character, or even of a statistical appearance, is taken up with an eagerness that is almost pathetic." Though, he adds significantly, "the community have not yet learned to be half skeptical and critical enough in respect to such statements." Fifteen years later another eminent authority, Carroll D. Wright, at present Director of the Washington Labor Bureau, was still able to state that: "In this country the popular demand for statistical information is usually far in advance of the government." And he too adds, the need for skilled compilers of such returns is great indeed. These remarks can apply, in the main, also to Canada, though at times in a modified sense, for on the whole, Canadians in the past have not been as nationally curious as their American friends. However, there is now growing up in Canada a strong desire for statistical information which is decidedly encouraging. Not alone for the mercantile classes is this the case, but it is true also for the administrative authorities, federal, provincial and municipal, as well as, and no less, for the student of social and of economic problems in this country, whose numbers are happily growing, and with sympathy will increase still faster. Without attempting to refresh your minds on the prime importance of statistics for all classes of thinkers—that were in these latter days hardly necessary—I have ventured to choose "Statistics" meaning thereby, a sketch of the history of statistics, as the subject of this paper before the Political Science Club for two reasons: because in this University, as indeed throughout Canada, there is no special attention given to this intensely practical subject; and, again, that I might take this opportunity to refer to the character of some of our Canadian statistical publications.

When "statistics" are referred to, the student may have in mind two fairly distinct conceptions: on the one hand, of a mere bald tabulation of facts like the accounts of a simple shop-keeper, on the other, of a perspicuous, methodical arrangement of these facts with reference to the general truths which they would demonstrate. This is, the word "statistics" may mean at one time merely statistical material or data, at another, so called scientific statistics.

Statistical data there has been for long ages. An official statistic—and this use of the singular form of statistics is becoming more and more legitimate—carried out by the Emperor of China over 4000 years ago is preserved to us by Confucius in the first chapter of part two of the Chou-King, the oldest Chinese book. The book of Numbers and many other parts of the Bible also give accounts of different enumerations of the fighting men of a tribe and the like. During early times, however, conceptions of arithmetical quantities were so crude and systems of notations and of enumeration so undeveloped that the value and extent of much early statistical work must not be exaggerated. Even down to modern times, as the statistical hyperbole of many a

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scribe will attest, the value of a cypher or two at the end of a number was often very inadequately appreciated, and some people would even venture to say that the same statement could be applied locally to-day! True it is, at least, that we have often wondered at the surprising following of a Xerxes, and at the astonishing number of deaths in some plague-stricken mediaeval town, which later investigation shows to have been quite impossible. In Roman times especially celebrated, not alone for financial but also for political and for social reasons, was the Roman census, which tradition dates from the time of Servius Tullius. The census under the Republic was made every five years, and for a time under the Empire every ten. It is claimed indeed that the Romans, if they may be represented by Cicero, had a true conception of the nature and importance of administrative statistics; for in his *de oratore*, lib. ii., Cicero states categorically "*ad concilium de Republica dandum caput est, nosse Rempublicam.*" Statisticians make frequent reference to this diction of the great Roman, as also to the latter's "*notitia rerum publicarum.*" To the Middle Ages belong, as sources of historical and statistical moment, the breviaria of Charlemagne, the national inventory of William the First of England, the Domesday Book, and the consular relazioni of some of the Italian Republics so often referred to by historians, as also local tax lists, gild documents and inventories of private manors. Systematic tabulation of births, marriages and deaths dates generally from the Reformation when the adherents of the rival churches were now more carefully marshalled. But still greater statistical activity was the result of the growth of mercantile policies and the development of national administrations and organizations in which the spirit of the intellectual awakening, the renaissance, was well reflected. This increased statistical activity was indeed, a feature of Sully's administration in France and also of Colbert's and Necker's; and it was to the first of this trio that falls the merit of having erected about 1602 a cabinet complet de politique et de finance, which may be regarded as the forerunner of modern statistical Bureaus.

In the erection of statistical offices England was not quick to follow the example thus set her now by France, and later on by one or two of the other continental countries. Not until the third decade of the present century was a permanent Statistical Bureau opened in England. But in 1832 such an office was attached to the Board of Trade, under the able direction of Mr. Porter, afterwards author of the well-known "Progress of the Nation." England, however, in the meantime, had not been neglecting the gathering of information, as will be indicated especially by her valuable parliamentary papers, dating from the latter part of the seventeenth century. On the continent Napoleon who regarded statistics as the "budget of things, without which there was no public safety" made his influence felt in the same direction: as did also the need of detailed information on the part of several of the over-trodden continental States both during and after the Napoleonic war. There was this difference, however, between then and now, that then all official information was looked upon as the peculiar and inviolate property of the government.

We have spoken thus far of administrative statistics, not of scientific statistics; and the development of statistics in the latter sense, that is, as the arithmetical science of facts, natural, social and political, has been peculiar. The word statistics itself, was first coined or roughhewn in Italy and polished in Germany. In Italy *ragioni di stato* was the science of the State, and the publicist or statesman, familiar with such department, was called *statista*. Thus Shakespeare in *Cymbeline* speaks of a statesman as a "statist": for which reason some of the English delegates to the Statistical Congress at London in 1860 proposed that those having to do with statistics should be called "statists." But the German University professors had long since taken over the Italian expressions, and having giving them a Latin form had popularised them. And "status" was their new word for state and "statisticus" that for statistics. Hence the word "statistician" (Statistiker) as well has been preserved.

This origin of the word shows that at that time statistics as a field for research were of a quite different character and extent to what they are at present. For these early statistics thus embraced all matters of interest to publicists—political geography, and general administrative and constitutional organization. Their aim was to give political wisdom and to this end their subject matter was, in short, to use a then familiar phrase, "the remarkable things of the State." For this reason they have been called "descriptive statistics." And so Sansovino's work, *Del Governo et Amministrazione di diversi Regni et Republiche*, etc., published in Venice about 1563, and regarded by M. Block as the first statistical work, describes some twenty different countries *così antiche, come moderne, now ancient, now modern*. It even included a description of the Republic Utopia of "Tommaso Moro, Cittadino di Londra," (!) but it is almost bare of any ciphering. And this latter may be said also of the writings of Comring in the seventeenth century, the founder of German University Statistics; and again, of Achenwall, Professor of the Political Sciences at Goettingen in the middle of last century, who because of his more conscious treatment of statistics as a department of political science, has since been called the "father of statistics." The well-known French title "*Etat de la France*" is a literary souvenir of somewhat similar conditions. It was this class of work that in Germany went by the name we have just mentioned, of "University Statistics," and the name is still used, though with a somewhat altered meaning.

This mention of Goettingen and of academic statistics makes necessary passing reference to a curious but not on that account less warm strife between two sets of eighteenth century statisticians. The Dane Anchersen, had published in 1741 a 'statistical' work arranged throughout in *tabular form*. And the model thus given was copied in Germany by Ockhardt and others, who laid stress on the tabular presentation of facts. At times even sentences and paragraphs were arranged to appear like tables! Though there was often no essential difference in the value of their statistical matter, yet the Goettingen School were pleased to contemptuously dub their rivals "Knights of the (statistical) table,"¹ and to refer to their work as "vulgar" in style. Amusing enough the main ground of strife thus was, there seems to have been this difference that the 'Knights' although having it seems, less ready access to official information, devoted more attention to arithmetical data than the academic men, and showed on the whole a more lively appreciation of succinctness of statement. In a certain sense then the 'Knights' may be said to have beaten the first mould for later German statistical work.

In the meantime, during the seventeenth and eighteenth centuries, statistical work of a somewhat more specific nature was shaping itself especially in England, under the characteristic name of "Political Arithmetic." Political arithmetic first embraced all calculations of national concern; population, trade, etc. And so this period of colonial expansion and of commercial development, a period of keen rivalry in these matters between Holland, France and England, was the peculiar era of such work. And with this work will always be associated the names of Petty, of Davenant, of John Graunt and of many others. The conception of political arithmetic, however, has since been narrowed to refer rather to practical calculations, such as that now carried on in England by actuaries,—computations with regard to pensions, to interest, to rent, and at times calculations of probabilities as seen in the mortality tables of our insurance companies. There has long been political arithmetic; and considerable political arithmetic there will always be. But it is a pity that such an honorable name should be known only by its epitaph; for the expressions Political Arithmetic and Social Arithmetic seem in many ways both more inviting and more suggestive than the vague and hybrid term statistics. Moreover, the latter word has a repellant, unmusical sound that in practice must probably be discounted at the expense of popular interest.

¹ An agreeable rendering of "Tabellenknechte."

On the continent and in England then, statistical work of a certain kind was being profitably carried on, but it was not until the present century, indeed, not until toward the middle of the century, that much further progress was made in scientific statistics. That is, not until the province of statistics had become less encyclopedic, and more clearly defined by the enfranchisement of Political Economy as well as by that of Geography and Ethnology, of the departments of Administrative Organization, and of Constitutional History. Independent statistical work advanced therefore, but slowly: though by the middle of last century the foundation of population statistics, or demography, was well laid by a Prussian Pastor, Suessmilch. Suessmilch's standpoint, however, was theological. He sought to prove by the relative frequency of births and of deaths, and by the numerical proportion in which men and women stood to one another, especially at the marriageable age, etc., that the Divine Laws with regard to society were an eternal and exact arithmetic. This theological study of society has been continued in our own century especially by Oettingen in his "Moralstatistik." In this connection the essay of Malthus on Population need hardly be mentioned, for Malthus' work was not statistical in character, but rather of the nature of a compilation. Thus indirectly and also directly statistics as a valuable ancillary science was impressing public opinion; and the result has been of late genuine sympathy between scholars and practical statisticians. The British Association, whose meetings were held in this City last summer, added a statistical section in 1830; and soon after was founded in Manchester a local statistical society, and in London, the Royal Statistical Society. If the final impetus to statistical activity can be laid to the credit of one man, that man was the Belgian Mathematician, Astronomer and Statistician Quetelet. This able thinker through his writings which enjoyed considerable popularity, by his enthusiastic championing of statistical investigations, and by the brilliant success he achieved in connection with the administration of the Belgian Census of 1846, and again through his epoch-marking publication of the full census returns, attracted the attention of Europe to his favorite subject as never before. And from this time practice and science have worked more and more hand in hand, while the giant arms of the printing press have carried statistical material to all parts of the world. In 1851, on the occasion of the London Exposition, an International Statistical Congress was formed which down to 1876 had held nine sessions in various parts of Europe. In 1878, the Congress gave place to the International Institute of Statistics which holds a session every two years and publishes a journal. By such means trained statisticians have been enabled to enjoy intimate converse one with another; and the technique of statistics has been correspondingly advanced. In the meantime a statistical society, similar to the one in London was founded in Paris in 1860. The United States has also made considerable advance in the same direction as the increasing activity of the American Statistical Association, founded some fifty years ago, and the recent multiplication on all sides of articles and works of a statistical nature readily indicate. At the same time we must register the existence of such valuable statistical publications of international importance as Neumann Spullart's *Review of the Markets of the World*, now edited by Von Juraschek, Von Mayr's *Statistical Archives*, the journals of the Royal Statistical Society, and of the French International Institute of comparative Statistics, and in America, the publications of the American Statistical Association. Concurrently with this development, or as part of it, statistical bureaux and official publications have been multiplied, and their rich fund made free to all.¹ Political and social facts arranged by statisticians have been popularized; and the conclusions of science, as also the generalisations of practice, have been controlled, checked and advanced. If in this connection we were to talk of Victorian Era development, we would say that the twentieth century will likely look back upon the sixty years just passed as the era in which by means of statistical investigation and development a sure foundation was laid for much of its economic and administrative progress, in a word, of its social organization.

¹ In the *Political Science Quarterly* for March, 1886, will be found a general account of the *Bureaux of Statistics of Labor in the United States*.

At the present time statistics as a science are taught in most of the continental universities, and in the United States at many of the larger seats of learning. In London a series of lectures on statistics is given at the London School of Economics by Mr. Howins. Possibly the most enthusiastic work of this character, however, is met with in Germany and Austria, where the Government statisticians are frequently at the same time university professors. This being the case the statistical bureaus are at definite hours the scene of most practical academic work. And if classic is that which popular esteem has pronounced good, then we must say that in these two countries, and, indeed, throughout western Europe, statistics are already classic.¹

In Canada statistical work is as yet not well forward. A decided lead however in such matters is taken by Ontario with her Bureaus of Industries and of Mines under the able supervision of Mr. James and of Mr. Blue. Of these two Bureaus the 14th and 6th Annual Reports respectively have just been issued. The valuable reports of the Bureau of Industries are divided into six parts, treating consecutively of :

1. The Weather, and the Crops.
2. Live Stock, the Dairy and the Apiary.
3. Values, Rents, and Farm Wages.
4. Chattel Mortgages.
5. Loan Companies.
6. Municipal Statistics.

Mr. Blue's report from its nature is more descriptive than statistical. Manitoba's activity as regards such work is also very commendable ; while the recent organization of statistical work in British Columbia under Mr. Gosnell is quite encouraging. Mr. Gosnell's recent issue of a provincial statistical year book merits special mention.² In the other provinces government publications are, however, not at all what we would wish for, and might expect. Reports, however, have recently come to hand that Quebec is now contemplating the erection of a statistical office. It would seem that some of the provinces in the past have been vainly endeavoring to throw the task and expense of statistical compilation and publication upon the Dominion, and are only now beginning to see the futility of such efforts, and to undertake the work themselves.

The plan to be adopted by public financiers for the scientific classification of receipts and expenditures is also a subject of statistical moment, and one which, in the United States, financial writers like Professor Seligman of Columbia College and Professor Plehn of Leland-Stanford University have been urging upon scientific and administrative attention. Certain it is that a presentation of the yearly incomings and outgoings in accord with the divisions adopted in financial treatises would greatly aid students of financial statistics and also likely make the work of the authorities less arduous. But this is a subject that in a paper like the present one we can but indicate.

It might be mentioned here that our own local statistics of births, because of their well-known incompleteness, are quite unreliable. The value of our municipal returns is also lessened by delay in publication. In Ontario these returns are not finally published until nearly two years after their period. The nondescript fashion in which some of these returns are first sent in by the local officials and the slender staff available for their auditing and review go a considerable way to explain this delay.

At Ottawa statistical work is carried out mostly by departmental officials, and some of these departmental compilations are admirably put together, such as the Fisheries Returns and

¹ The peculiar and interesting role of statistics in the history of German Political Economy is indicated in a brief article by the present writer in the *Economic Journal* for March, 1898.

² The Year Book of British Columbia, and Manual of Provincial Information, etc., by R. E. Gosnell, Victoria, 1897, pp. 500.

the Public Accounts' Book. Greater speed in publication, however, is in many cases very advisable. In some departments this can likely be achieved only by a better organization of the statistical staff. I have in mind here more especially the customs returns, whose appearance is of necessity delayed until all the local officials have found time to make up their reports. All such work, it would seem, might be profitably transferred to the Department at Ottawa. Furthermore, in place of the three separate offices of the Customs Department, of the Department of Inland Revenue, and of Trade and Commerce, one large single bureau might materially simplify and strengthen our trade statistics, while the existence of such an office would likely admit in the future of the issue of a valuable trade bulletin.

The standard of Canadian statistical work, however, will popularly, and, likely, generally be judged largely by the character of the publication bearing the name of the Statistical Yearbook of Canada, published under the direction of Mr. George Johnson, in the Department of Agriculture. The Yearbook is a summary of information concerning Canada based upon Dominion and Provincial departmental returns. I have given a brief review of this compilation in Professor Wrong's "Review of Historical Publications relating to Canada," now in press, so need not discuss its merits and demerits here. Though I would say that because of the influence such a publication might and should exert on statistical work throughout the country, because again, of the important position it holds with regard to the dissemination of statistical knowledge concerning Canada, and because of its being the possible nucleus of considerable statistical activity in the future our Yearbook should be compiled with somewhat greater regard for statistical method.

With regard to our census publications two points deserve notice in such a review as we are now making. They are, first, that the census officials have taken as basis of their population returns the *de jure* in place of the *de facto* population, and in this they have set before them, as is admitted by statisticians, an ideal statistically impossible and for practical purposes undesirable. That this is the case a little reflexion on your part will likely suffice to show. For in this migratory age and country to presume for an instant that our local untrained census enumerators could determine with any degree of certainty the legal population is too irrational, and again totally irreconcilable with the aim of a census to give, as it were, an instantaneous political and social photograph of the country in question. On the other hand we do not wish to belittle the value of an enumeration of the legal population. Under certain conditions such a census might be of considerable importance.¹ And in the second place, statistics of industrial establishments in Canada have been based upon the definition that an industrial establishment is "any place where one or several are engaged in manufacturing, altering, making up or changing from one shape into another, materials for sale, use or consumption." Such an artificial definition of an industrial establishment makes any statistics based upon it of very conjectural value. Indeed it is really difficult to say what useful purpose these returns in their present form can serve; while from another point of view, in the hands of uncritical readers they may be highly misleading.

Without referring to the statistical material supplied by semi-private foundation, such as joint stock companies, boards of trade, and the like, we can now see that in different quarters of Canada we possess good statistical material; though on the other hand we see equally well as regards statistical work that for Canada as a whole, with the possible exception of Ontario, there is considerable room for a more pregnant and promising organization. In accord with the genius of Anglo-Saxon people any such organization must follow along essentially practical lines. And it is in agreement with this spirit that we see prospects, as indicated, for a Bureau

¹ Attention may be directed here to an interesting resumé of Canadian census returns since 1665 in Volume 4 of the census publications of 1870-71. As regards detailed systematic census work it will be found that the Canadian census of 1665 is perhaps the earliest instance of a modern census.

of Trade Statistics at Ottawa and for a further development of the present Dominion Census Office. It is to be hoped, also, that in their statistical activity federal and local authorities will come to work more in unison, each assisting and supplementing to a greater extent than at present the work of the others.

In the meantime, however, for the benefit of the students of economic Canada, as also of financial, mercantile and other classes, a careful collection by our provincial or legislative libraries of all blue books and official reports published in Canada, and if possible, in the United States and England as well, would be of great and growing value. Such a series of collections, feasible as it is, may seem almost too good to be realized! In the new City Hall in this city I am informed, however, and I hope correctly, that some provision is being made for a municipal library to contain municipal documents and reports and general works of municipal importance. Of our own legislative library we can only say that it is quite incomplete. In fact at present in Canada the parliamentary library in Ottawa is the single library possessing such literature to any considerable extent, and its collections are mainly local in nature.

But I have already trespassed, I fear, upon your patience. If there are any mathematicians present, drawn hither by the bewitcheries of the club's able artist as displayed on the notice board in the Aula, they will likely be disappointed in not having heard discussed the technique of statistics. But statistical averages, weighted means and the like are matters to be learned and appreciated, as in literature, only in practice and in the study of good authors. However, I hope that the members of this club will go away with the idea that statistics after all are possibly not altogether mere dry drudgery, but to the social and administrative connoisseur, tradition to the contrary notwithstanding, something both refreshing and important. And while we keep in mind that statistics are but the abbreviated expression of facts and of science, it will not do to forget that for that very reason they are to be read with all the greater care. Thereby will much of the abuse at times heaped upon statistics be rendered impossible and our own knowledge at the same time still further advanced.

S. M. WICKETT.

SOME NOTES ON THE GROWTH OF MUNICIPAL INSTITUTIONS IN ONTARIO.

"Municipal institutions are to liberty what primary schools are to science; they bring it within the people's reach; they teach men how to use and enjoy it. A nation may establish a system of free government, but without the spirit of municipal institutions, it cannot have the spirit of liberty."

DETOCQUEVILLE, "Democracy in America," Vol. I, c. 5.

The Province of Upper Canada, even before it was formally set apart by the Constitutional Act of 1791 (31 Geo. III., c. 31), had been divided by Lord Dorchester's proclamation of 24th July, 1788, into four districts, namely: Lunenburg (a), commencing at the present eastern boundary of the Province of Ontario and extending to a north and south line drawn through the mouth of the River Gananoque; Mecklenburgh, from this to a similar line running through the mouth of the River Trent; Nassau, from this to the end of Long Point on Lake Erie; and Hesse, comprising all the rest of the Province from thence to its western boundary (the middle of the Detroit and St. Clair Rivers and of Lake Huron (b)), and extending north-westward to the undefined limits (if any) of the king's jurisdiction. (See the proclamation in Thomson & McFarlane's collection of the statutes of U. C. (1831), at p. 23).

For the purpose of parliamentary representation, and also for militia purposes, (c) these districts were afterwards divided, by a proclamation (d) of Governor Simcoe, dated 16th July, 1792, into the nineteen original counties of Upper Canada, viz., Glengary (a), Stormont; Dundas, Grenvill (a), Leeds, Frontenac, Ontario (consisting of "Isle Tonti," or Amherst Island, "Isle au Foret," or Gage (now Simcoe) Island, Grand (or Wolfe) Island, and "Isle Cauchois," or Howe Island) Addington, Lenox (a), Prince Edward, Hastings, Northumberland, Durham, York, Lincoln, Norfolk, Suffolk, Essex and Kent. It was not, however, until 1849 (more than fifty years later) that the county succeeded the district as a division for municipal or judicial purposes.

The four original districts,—re-named at the opening session of the first Parliament of Upper Canada (32 Geo. III., c. 8), the "Eastern," "Midland," "Home" and "Western" Districts,—had, by Jan. 1st, 1800, been increased by sub-divisions consequent upon accretion of new territory and growth in population to eight, the Johnstown, Niagara, London and Newcastle Districts being thus formed. (e) In 1849, when the county first became the unit of division for municipal and judicial, as well as for parliamentary purposes, there were twenty districts in Upper Canada. (f)

The management of local affairs in each of these districts, including much of the work afterwards entrusted to municipal councils, was, until 1842, transacted by the (Crown-appointed) Justices of the Peace for each district in their General Quarter Sessions assembled.

In 1793, and for some years thereafter, the Court of General Quarter Sessions for the Eastern District used to meet twice a year at New Johnstown (now a mere hamlet in the Township of Edwardsburgh, three miles east of Prescott) and twice a year at Cornwall; that for the

(a) This is the original spelling.

(b) Treaty of Paris, 1783; Houston—"Documents Illustrative of the Canadian Constitution," p. 267.

(c) De la Rochefoucauld-Liancourt. "Voyage dans les Etats Unis et le Haut Canada;" (1795-1797) Vol. I., p. 434. "County Lieutenants," answering to the Lords Lieutenant of English counties, were appointed by Governor Simcoe in and for each of the nineteen counties established by this proclamation. To them was committed the organization and command of the militia of the county, and the magistrates thereof were appointed upon their recommendation. A list of the first County Lieutenants thus appointed is given at p. 142 of a recent and most interesting history of the Western District, entitled "Harrison Hall and its Associations," by His Honour Judge Woods, of Chatham, Ont.

(d) Thomson & McFarlane's Statutes of U. C. (1831), p. 24.

(e) 36 Geo. III., c. 5, ss. 10, 25, 32, 37; Proclamation, Jan. 1st, 1800, recited in 42 Geo. III., c. 2

(f) 12 Vict., c. 79, Sched. B.

Midland District in like manner alternately at Kingston and Adolphustown; the Home District Court quarterly at Newark (Niagara-on-the-Lake); and the Court for the Western District "in the Town of Detroit," an annual special session of the Peace at Michilimackinac, now "the British Landing," Mackinac Island, Mich., (33 Geo. III., c. 6, and 35 Geo. III., c. 4; 41 Geo. III., c. 6). (a)

The powers of Justices of the Peace at these sessions assembled included (*inter alia*) the erection and management of court houses, gaols and asylums; laying out and improving the highways; making assessments for these purposes, and also "to pay the wages of members of the House of Assembly," (34 Geo. III., c. 6; 36 Geo. III., c. 7; 47 Geo. III., c. 7); making regulations to prevent accidental fires (32 Geo. III., c. 5); the appointment of district and township constables (33 Geo. III., c. 2, s. 10); fixing the fees of gaolers (32 Geo. III., c. 8, s. 17), of town or parish clerks (33 Geo. III., c. 2, s. 13), and of pound-keepers (*Ibid.* and 34 Geo. III., c. 8, s. 3); the appointment of street and highway surveyors (50 Geo. III., c. 1, s. 2; 4 Geo. IV., c. 9, s. 4), and inspectors of weights and measures (4 Geo. IV., c. 16, s. 4); the regulation of ferries (37 Geo. III., c. 10); the establishment and regulation of markets in various towns, [*e.g.*, Kingston in 1801 (41 Geo. III., c. 3), York in 1814 (51 Geo. III. c. 15), Niagara in 1817 (57 Geo. III., c. 4), Cornwall in 1818 (59 Geo. III., 1st session, c. 4), Perth in 1822 (2 Geo. IV., c. 15)]; also the granting of certificates to applicants for licenses to sell liquor (34 Geo. III., c. 12), and to ministers or clergymen of "dissenting" congregations, authorizing them to solemnize marriages (38 Geo. III., c. 4, ss. 1 and 2; 1 Wm. IV., c. 1).

The germ of that democratic system of municipal institutions which now has so completely superseded this oligarchic method of government through nominees of the Crown may be found so far back as 1793 in the Act, 33 Geo. III., c. 2, entitled "An Act to provide for the Nomination and Appointment of Parish and Town Officers within the Province." This Statute enabled any two of His Majesty's Justices of the Peace by their warrants, to authorize the constable of any parish, township, reputed township or place, to assemble on the first Monday in March (afterwards changed to the first Monday in January) in each year, the inhabitant (ratepaying) householders of the parish, township etc., in the parish church or chapel, or in some convenient place within the parish, etc., to choose for the ensuing year a parish, town or township clerk, two assessors, a collector, a number (repeatedly increased) of overseers of highways and fence viewers, a pound-keeper and two town wardens. If there was a parish church and a duly appointed minister thereof, he appointed one warden, and the "town-meeting" (b) elected the other, the two being then styled "churchwardens." Beyond simply electing these officers to carry out the laws made by Parliament, the meeting had no legislative power except to determine the height of lawful fences, and (by 34 Geo. III., c. 8), "to ascertain and determine in what manner and for what periods horned cattle, horses, sheep and swine, or any of them, shall be allowed to run at large, or to resolve that they or any of them shall be restrained from so

(a) See "Harrison Hall and its Associations," pp. 36-38.

(b) "The town-meeting of New England played a most important part in the education of the people in self government. There all the qualified male inhabitants met together, and discussed and decided a wide range of matters of local concern. Why was this system not introduced in its entirety into Canada? It is frequently supposed that the reason was that the British Government, taught by the experience of the revolted colonies, feared the town-meeting as a school of independence. It is true that town-meetings were suppressed in Nova Scotia in 1770, the very year that Boston town-meeting, under the guidance of Samuel Adams, was leading all the other "towns" of Massachusetts, in opposition to the Government of King George. This may accordingly have been one of the reasons why the local government established in Upper Canada took the shape it did. But there is another and still more important reason that has hitherto been overlooked. It is that it was not the example of New England that was directly before the eyes of the first settlers in Upper Canada, but the example of the neighboring State of New York. It was from thence that most of the U. E. Loyalists came. Indeed an old settler writing in 1816, expressly describes (Canniff, History of Ontario, p. 189), the system of government established in 1791, and the years immediately following, as 'a constitution similar to that which they (the old settlers) had lost during the Rebellion in the Province of New York.'"—(Prof. Ashley's Introduction to "The Ontario Township," by J. M. McEvoy—Tor. Univ. Studies in Political Science, 1st Series, No. 1.)

doing." (a) [For extracts from the minutes of some of these "town-meetings" see Canniff's "History of Ontario," pp. 454, 471, 481, 492. The earliest is that of Adolphustown, the date of which, as given by Canniff, is 6th March, 1793, though the Act did not come into force till July 9th of that year.]

The two wardens thus elected (or elected and appointed) became "as a corporation to represent the whole inhabitants of the township or parish," with power to sue, prosecute and defend on their behalf; but except as aforesaid they were entirely without any legislative capacity. The Justices of the Peace for the district in their Quarter Sessions assembled retained all the authority above indicated; in case of non-election by the ratepayers, they appointed the town officers, and in every case they filled any vacancies occurring during the year by death or removal (46 Geo. III., c. 5; 48 Geo. IV., c. 14, s. 4).

As towns arose, and markets were established therein, the Quarter Sessions were further empowered to make for these towns "such prudential rules and regulations as they might deem expedient," relative to watching, paving, lighting, keeping in repair, cleansing and improving the streets of such towns; regulating the assize of bread; slaughter houses and nuisances; firemen and fire companies; enforcing the laws relative to inspection of weights and measures; and as to horses, swine or cattle running at large in the town. (57 Geo. III., c. 2; 59 Geo. III., c. 5; 4 Geo. IV., c. 30): and see 7 Geo. IV., c. 12 (Kingston).

Gradually, however, the power to regulate these matters was transferred in towns to representative bodies annually elected by the resident (male) householders under the name of "Boards of Police." To these, from the very first, were granted additional powers, e.g., to appoint the town clerk, treasurer and street surveyor, assessors, collectors and bailiffs, and to fix their remuneration; to make assessments for purchasing real estate for the use of the town, and for procuring fire engines, aqueducts (*sic*), and a supply of pure wholesome water; lighting, paving and repairing the streets; to regulate and license victualling houses and public exhibitions of showmen and mountebanks; to regulate carts and carmen, wharves and quays, the weighing of hay, the measuring of wood; to prevent riding or driving on sidewalks or at an immoderate pace, the firing of guns and pistols, squibs and fire balls, injury to shade trees, the pulling down or defacing of sign boards (evidently there were "Mohocks" in those days), indecent inscriptions on buildings, walls and fences, encroachments on streets, etc., and "generally to prevent vice and preserve good order in the town," and "to make such rules and regulations therefor as they might deem expedient," with power to enforce the same by inflicting a penalty of one pound ten shillings for violation of any by-law or ordinance of the corporation. (See 2 Wm. IV., c. 17 (Brockville); 3 Wm. IV., c. 16 (Hamilton); 4 Wm. IV., c. 25 (Cornwall); c. 26 (Port Hope); c. 27 (Prescott); 6 Wm. IV., c. 14 (Belleville); 7 Wm. IV., c. 42 (Cobourg); c. 44 (Picton). In later statutes the list of powers entrusted to these boards of police is much more extensive, e.g., 8 Vict. c. 62 (Niagara); c. 63 (St. Catharines); 9 Vict. c. 71 (Cobourg).

Still larger powers were granted by the incorporation Acts of certain cities and towns, [e.g.: Toronto in 1834 (7 Wm. IV., c. 39), Kingston in 1838 (1 Vict. c. 37), Cornwall in 1846 (9 Vict., c. 72), Bytown, Dundas, London and Brantford in 1847 (10-11 Vict., cc. 43, 45, 49)]; and their municipal government was vested in a mayor and common council, the mayor being chosen by (but not in every case from) the council.

(a) "The two questions 'What shall be a lawful fence?' and 'What animals shall be free commoners in the township for the year?' were the only questions concerning which town-meetings might really legislate, but they might and did discuss far weightier matters. Public sentiment on the largest public questions was here fostered. This, however, was not so important or valuable as the quality of mind that was developed. Little as was their law-making power, it was enough to show every man present the real necessity for laws, how laws were made, that laws were simply rules which ought to be the most advantageous that could be devised for the community, and that the community had an undoubted right to change these laws if they saw that a change would be an improvement. It was the conception of law that was fostered in the men of Ontario by their town-meetings which led in a large measure to the establishment of responsible government in this Province."—McEvoy, "The Ontario Township," p. 20.

In 1847, a general Act (10-11 Vict., c. 42) was passed enabling the inhabitant householders of any town or village not specially incorporated, to elect "police trustees" who were empowered to enforce within the town or village the regulations now contained in s. 667 of the present Municipal Act (1892), regulations which (*mirabile dictu*) have remained on our statute books unamended for fifty years!

Municipal affairs in rural localities, however, still continued to be managed by the Quarter Sessions for the district acting through the officers appointed under the "Parish and Town Officers Act" of 1833, and the amendments thereto, as consolidated and re-enacted by the "Township Officers Act" of 1837, (1 Vict., c. 21).

The contrast, thus continually becoming more marked, between the measure of local self-government accorded to the urban as compared with the rural elector, was one which could not fail to produce, and certainly did produce, in the latter a feeling of profound dissatisfaction, which indeed was not wholly without cause. Mr. McEvoy, in his interesting paper on "The Ontario Township," says: (pp. 20-22).

"A full and careful study of the 'orders' of the different District Courts of Quarter Sessions would, I believe, do very much to explain and justify the irritation which was so prevalent during the time that these Courts exercised their taxing and regulating authority. The Court of Quarter Sessions was composed of the magistrates of the district. The London District consisted of some thirty-two townships, which may be roughly described as those now constituting the Counties of Middlesex, Oxford, Huron, Elgin, Brant and Norfolk. At some of the sessions of this Court I find that twenty-three magistrates were present, but the usual number present was from six to eleven. . . . All the public funds available for the building of roads and bridges in six counties were in the hands of these eight or ten men appointed for life by the Government. In the matter of roads and bridges they were indifferent and incompetent; they neither knew the needs of the district nor were they sufficiently anxious to supply them to make them at all fitted to open up a new country. In the matter of gaols and other public works the Court was also invested with large authority. They procured plans and estimates for the building of a gaol and court house, of what dimensions they deemed fit, erected these buildings and ordered the people to pay whatever expense had been incurred in the process. Their worship also ordered what fare the prisoners should get, and contracted for the supply of provisions; they ordered what fees the district officers should receive; they had control of public charity and occasionally voted a pittance for the relief of an unfortunate pauper. They exercised the right of granting or withholding the authority to solemnize marriage, ministers of any but the English Church being allowed to perform this ceremony only after much trouble and annoyance. Besides this large statutory authority they might venture on almost any stretch of power and no person was willing or able to make question of their actions. A body of public officers with such large and unrestricted powers would now be considered by the people somewhat dangerous, even were its members annually subject to popular election. The magistrates, however, who exercised these enormous powers in Quarter Sessions were life appointees of the Government, who often had very meagre qualifications to recommend them for public office. They were frequently old army officers with pensions, and almost always men of sufficient income from some source to render them indifferent to and independent of the hardships and wants of the average hardworking settler."

Yet nearly half a century elapsed before "the conception of law fostered in the men of Ontario by their town-meetings" came to its birth, and (as we shall presently see) it was born at last amid sore travail. In 1841 (the year of the union of Upper and Lower Canada) was passed the "District Councils Act" (4 and 5 Vict., c. 10), by which the inhabitants of each district were, from January 1st, 1842, constituted a municipal corporation, and the persons qualified to

vote for township officers under the "Township Officers Act" were empowered also to elect representatives to a "District Council" in which was vested (s. 39) the powers to pass by-laws relative to roads, bridges, public buildings, schools, the expense of administration of justice, to determine the remuneration of all district and township officers, and to levy taxes for these purposes upon real and personal property within the district. To these elective councils were now transferred (s. 51) all the powers theretofore vested in the Quarter Sessions relative to highways and bridges or work connected therewith, the appointment of road surveyors and other road officers, and the right to levy taxes for any purpose connected with the subjects over which the District Council was thenceforward to have jurisdiction.

This important Act, "which established the municipal system of Upper Canada," was introduced during the first session after the Union, by the Honorable S. B. Harrison, then Provincial Secretary for Upper Canada. (a) The late Sir Francis Hincks, then member for Oxford, tells us in his "Reminiscences of My Public Life," that the Governor (Lord Sydenham) had strongly recommended the establishment of municipal institutions in Canada by the Union Act (Imp. Stat. 3 and 4 Vict., c. 35).

He says (p. 63):

"Clauses with this object were included in the Bill sent by him to England (b); but during the discussion in the House of Commons they were withdrawn, as being more properly a subject for local legislation. Lord Sydenham thereupon introduced into the Special Council an ordinance for their establishment in Lower Canada, and framed it so as to secure, as far as in his power, that it should not become a dead letter. The Municipal Bill introduced into the Assembly during the first session of the first Union Parliament, was substantially the same as the Lower Canadian ordinance; and it soon became apparent that there would be formidable opposition to it. The Conservatives of Upper Canada, led by Sir Allan MacNab, were strongly opposed to the extension of popular control over the local affairs of the people. The Lower Canadians were prejudiced against the ordinance of the Special Council, and had no desire to support any measure emanating from a Government to which they were in strong opposition. Mr. Baldwin [the Hon. Robert Baldwin, then one of the members for Hastings] grounded his opposition to the Bill on the provision for the appointment of the warden, treasurer and clerk, by the Crown instead of by the municipal bodies; and I believe I am correct in stating that his opinions were shared by the Reformers generally. At an early stage of the proceedings, the

(a) A very interesting sketch of the public life of the Hon. S. B. Harrison is given by His Honor Judge Woods, in "Harrison Hall and its Associations" (pp. 12-13, 29-30). From it, from Rev. Dr. Scadding's "Toronto of Old," and from Dent ("The Last Forty Years") we learn that before coming to Canada in 1837 he had taken his degree at Cambridge and had already attained some distinction at the English Bar. His edition of "Woodfall on Landlord and Tenant" was well and favorably known to the profession both here and at home, and he was also the originator and compiler of an "Analytical Digest of all the Reported Cases determined in the House of Lords, the several Courts of the Common Law in Banc and at Nisi Prius, etc., from M. T. 1766 to E. T. 1843, including Crown Cases reserved; in Four Volumes;" the precursor, in fact, of our beloved "Fisher's Digest." In 1839 he became Private Secretary to the Lieutenant-Governor of Upper Canada, Sir Geo. Arthur, and in 1841 Provincial Secretary for Upper Canada in Lord Sydenham's cabinet, and member for Kingston in the First Parliament of United Canada.

Besides the District Councils Bill referred to in the text, he introduced the first general school bill for U. C., and moved the celebrated resolutions of Sept. 3rd, 1841, respecting responsible government in Canada, which "constitute, in fact, the articles of agreement upon that momentous question between the executive authority of the Crown and the Canadian people." (Todd's "Parliamentary Government" p. 56). In 1844 he was elected to the Second Parliament of Canada as member for Kent (which, as well as Hamilton, had rejected him in 1841), but resigned his seat before the first session of that Parliament, on account of the resolution of the Administration of which he was a member to transfer the seat of Government from Kingston to Montreal. He was thereupon appointed Judge of the Surrogate Court, and (later) District Judge for the Home District (including Toronto) where he died in 1887. "Conscientious scruples as to the infliction of capital punishment prevented him from accepting a seat on the Superior Court Bench, but upon the County Court he conferred a new dignity by becoming one of its judges." Dr. Scadding says: "The memory of Judge Harrison as an English gentleman, genial, frank and straightforward, is cherished among his surviving contemporaries."

(b) The Bill was drafted chiefly by the Hon. James Stuart, then Chief Justice of the Court of Queen's Bench for Lower Canada, who, for his services to Lord Durham and Lord Sydenham, was afterwards created a Baronet of the United Kingdom (Dent,—"The Last Forty Years," Vol. I., pp. 42-3).

Lower Canadian ordinance was referred to the Committee of the whole on the Upper Canada Bill, with the view to having them made alike in all essential points. This rendered it impossible for the Government to yield to the Upper Canadians on points that were deemed essential for Lower Canada, and it was soon formally announced that if any important amendments were made in the Government Bill it would be withdrawn."

Some of the divisions on the Bill were exceedingly close; and the clause providing that wardens should be appointed by the Crown was carried by the casting vote of the Chairman of the Committee (Dent,—*"The Last Forty Years,"* Vol. I., p. 147).

Speaking in support of the third reading, Mr. Hincks said:

"The honorable and gallant knight from Hamilton [Sir Allan MacNab (a),] and the honorable and learned member for Lennox and Addington (Mr. J. S. Cartwright), say that this Bill is republican and democratic in principle; and that if it be adopted the people will have almost uncontrolled power. At the same time we are assured by the honorable and learned member for Hastings (Mr. Baldwin) that it is 'an abominable Bill,' 'a monstrous abortion,' 'that he views it with detestation.'" (Reminiscences, p. 66).

But as Dr. Bourinot justly observes (*"Local Government in Canada,"* p. 70):

"Imperfect as was the Act of 1841, it marks the commencement of a new era in the municipal government of Canada. In the course of a few years it was amended, and the people at last obtained full control of the election of their own municipal officers."

In 1843 the Honorable Robert Baldwin, (b) then Attorney-General for Upper Canada, introduced a general municipal Act "to provide for the incorporation of the townships, towns, counties and cities in Upper Canada." The Bill passed its third reading in the Legislative Assembly, and was sent up to the Legislative Council, from the seclusion of which it never emerged; and a fortnight before the close of the session the Baldwin-Lafontaine Government (all but Mr. Dominick Daly) resigned office on account of their differences with Sir Charles Metcalfe over the (then burning) question of responsible government. (Dent,—*"The Last Forty Years,"* cc. 13-16).

It was not until March, 1848, during a session which ended on March 23rd, that the second Baldwin-Lafontaine Government was formed. Early in the following session (1849) Mr. Baldwin re-introduced (with some amendments suggested by the experience of the preceding six years) the Bill which the Legislative Council had killed in 1843, but which now passed into law as 12 Vict., c. 81, entitled "An Act to provide by one general law for the erection of municipal councils and the establishment and regulation of police in and for the several counties, cities, towns, townships and villages in Upper Canada."

In the same session, by an Act 12 Vict., c. 79—after reciting that by reason of the subdivision of the districts of Upper Canada their boundaries had in many cases become identical with the boundaries of counties, and that there was no longer any sufficient reason for their continuance, and that it was therefore expedient to abolish the territorial division of the Province into districts, and, "following in this respect the example of the mother country," to retain only the name of "county" as a territorial division for judicial as well as for other (including municipal) purposes—it was provided that the district gaols, court houses, grammar

(a) I think it was probably in the discussion upon this Bill that Sir Allan MacNab gave to the district councils to be thereby created the afterwards historic title of "sucking republics." Perhaps some reader can verify my conjecture?—C. R. W. B.

(b) Why has no one yet written a satisfactory biography of the Honorable Robert Baldwin? Surely a memoir of the life and times of one who took so prominent a part in Canadian politics during those eventful years in which the struggle for responsible government was fought and won,—the eponymos, so to speak, of the "Baldwin Reformers" a political species not yet wholly extinct,—might be made most interesting to students of Canadian history. Materials, apparently ample, for such a work are still accessible in documents in the possession of Mr. Baldwin's numerous descendants, and in the recollections of his surviving contemporaries.—C. R. W. B.

schools and district officers should thenceforth belong to the counties and unions of counties (twenty in number) mentioned in the schedule to the Act; and by c. 80 of the same session all previous (local) Acts of incorporation were repealed, together with most of the "Township Officers Act" (1 Vict., c. 21); the "District Councils Act" (4 and 5 Vict., c. 10) and the "Police Trustees Act" (10 and 11 Vict., c. 42), with the amendments thereto respectively.

These statutes were, however, only ancillary to the principal Act—viz., the General Municipal Act (c. 81)—which not only incorporated all the most valuable provisions of the statutes thus repealed, but also, with a prescience which shows it to be the work of a master mind, sketched in outline at least, the frame work of the municipal system of Canada as it has since continued to this day.

It would not be too much to apply to the scientific, comprehensive and statesman-like enactment known as the "Baldwin Municipal Act of 1849," the words used by the learned editors of the last edition of Mr. Arnold's treatise on the English Municipal Corporations Act, and say that "it may fairly be termed the Magna Charta of the Municipal Institutions" of Canada. To how large an extent it forms the basis of our present municipal law will appear from the notes appended to many sections throughout the new edition of "The Municipal Manual" to which some portion, at least, of this article will form a prefatory chapter.

Although amended at nearly every session of Parliament from 1849 to 1897—though seven times consolidated, and on each occasion to some extent recast—the changes made in it during the past half century have been chiefly in the direction of amplification and detail. Never has the principle of local self-government been more fully carried out than in the Act of 1849; and, though the powers of municipal councils have since been extended to many subjects not at that time foreseen and therefore not therein provided for, they have in respect of other matters been since then curtailed. Especially since Confederation there has been a tendency to transfer to government officials and to bodies such as boards of health, license commissioners and police commissioners, of a less directly representative and popular character, than our municipal councils, certain of the powers which were formerly exercised by these councils or by their officers.

Furthermore, the Baldwin Act and its lineal descendants have in their turn become the progenitors and paradigms of the municipal institutions Acts in force to-day in nearly every other Province of the Dominion. This will be more fully shown in a future paper, in which I hope to attempt a comparison of the Municipal Act of Ontario with those of Quebec, Nova Scotia, New Brunswick, Manitoba (whose municipal legislation is almost precisely the same as in Ontario); British Columbia (where it is very similar, but I think better arranged) (*a*), and the North-West Territories, where the ordinance (*b*) governing municipal institutions is taken almost wholly from the Ontario Statute then in force (55 Vict., c. 42).

C. R. W. BIGGAR.

(*a*) See the consolidation of 1896, 59 Vict., c. 37 ("Municipal Clauses"); c. 38 ("Municipal Elections") and c. 39 ("Municipal Incorporation.")

(*b*) Ordinances N. W. T., No. 3 of 1894.

THE MUNICIPAL GOVERNMENT OF ONTARIO.

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The Consolidated Municipal Act and the Consolidated Assessment Act of Ontario. 1897.

The settlement of Ontario began with the declaration of American Independence, and the first settlers were made up principally of emigrants from the New England States. Most of them came from New York State who brought with them ideas as to self government that were put into shape as soon as opportunity presented itself. The first Legislature of Upper Canada was summoned in September, 1792. On April 9th, 1793, there came into operation *An Act to provide for the Nomination and Appointment of Parish and Town Officers within the Province.*

The era of town meetings and quarter sessions was thus begun, and it lasted until 1841, when Upper and Lower Canada were united under the name of "The Province of Canada." In 1841 there was passed *The District Councils Act*, introduced by the Hon. S. B. Harrison. This continued until 1849, when the Baldwin Municipal Act was passed, which gave us municipal government in the general form that we have to-day, except that in 1896 a new County Councils Act was passed. In studying the growth of municipal government in Ontario, therefore, we have as divisional lines these dates: 1793, 1841, 1849, 1896.

The limits of such a paper as this will not permit a historical review of the changes that have taken place at and between these four dates, the student may refer to the works quoted at the head of this paper for full information upon these points. We shall confine ourselves mainly to a survey of the situation as it exists at the present day.

The township is the basis or beginning of municipal organization in Ontario. In the latter part of the previous century the first settlers brought to this Province the township form of government of New England as distinguished from the county government of Virginia and neighboring states.*

In the early settlement of Ontario natural conditions had much to do with fixing the boundaries of the townships which were first laid out or surveyed along the St. Lawrence river, around the Bay of Quinte, in the Niagara Peninsula and in the vicinity of Detroit. These first scattered sections of settlements were gradually connected by government roads, military roads in some cases. As population increased new townships were surveyed along these roads. As a consequence, a glance at a township map of Ontario will present many peculiarities of form and a great variety of size—for instance, in the County of York, the county adjacent to the City of

* See Civil Government in the United States by John Fiske, Houghton, Mifflin & Co., 1890, pp. 34, 57.

Toronto, there are at present ten townships varying in size from 28,532 acres to 87,064 acres. In more recent years, however, greater uniformity has been aimed at, and the regulation size for townships northwest of Lake Superior is six miles square, 23,040 acres, with boundaries running exactly north and south and east and west. This is the plan also adopted in many western and central states.

Whenever it is deemed advisable to have a new township surveyed the work is done by order of, or under the direction of, the Provincial Crown Lands Department. The plans and field notes are placed on file in the Department, and the new township is then removed from the great unsurveyed portion to the surveyed portion. The name of the township is also selected by the Commissioner of Crown Lands, and of late years many of the names given have been selected to immortalize some member or ex-member of the Local Legislature. The earlier townships surveyed were given names duplicating counties in the British Isles, in honor of the various Indian tribes, or some members of the reigning family of Great Britain. In one section we are told that the names Tiny, Tay and Flos perpetuate the memory of the three favorite lap dogs of the Governor's wife.

At the present time in addition to the townships fully settled and that have altogether passed out of the possession of the Crown there are 161 townships surveyed and open for purchase from the Crown.

It may be mentioned here that the total area of the settled and organized portion of Ontario was as follows in 1895:

	Acres.
Townships	23,114,356
Villages	146,308
Towns	100,943
Cities	40,548
Total	23,402,155

The total area of Ontario is calculated by the Ontario Crown Lands Department to be 126,000,000 acres, but the Dominion statistics branch gives the land area at 219,650 square miles or 140,576,000 acres. Taking the smaller estimate we find that less than twenty per cent. of the Province has as yet been settled, and that over eighty per cent. is still in the hands of the Crown. In round figures there is an area of 100,000,000 square miles unsurveyed, a considerable portion of which is even unexplored, and less known than the valley of the Yukon. Now let us return to the development of a new municipality.

ORGANIZATION OF MUNICIPALITIES.

Townships.—During the early days of settlement of a township its inhabitants are not left free from municipal privileges or responsibilities, but as a rule the Lieutenant-Governor, by proclamation, joins the township to one or two other similar townships, and these may be attached to the nearest organized county, or they may be left simply as a union of townships if in one of the judicial districts of the north.

When the number of resident freeholders and land holders amounts to 100, or, under certain conditions, when the number amounts to 50, the township is separated from the other townships and is entitled to a separate municipal existence. In this way also other neighboring townships will become settled and in time the Lieutenant-Governor proclaims the union of these townships to be a county, which is then attached to the nearest incorporated county.

When the population of this junior or attached county amounts to 17,000 the junior county may, on petition to the Lieutenant-Governor, be separated from the older county and be formed into a new independent county.

On December 31st, 1895, we had in Ontario 492 organized townships having an area of 23,114,356 acres with a total assessed population of 1,109,631. This would make an average of 46,980 acres with a population of 2,266. The total number of ratepayers was 355,828 making the average lot assessed just about 65 acres.

Unincorporated Villages.—Here and there in the township there will be found a crowding together of the residents. These residents desire a name and a recognition. A petition signed by a majority of these ratepayers, of whom at least one-half must be resident freeholders, is presented to the council of the township and a by-law may then be passed by this council setting apart this section of the township as an unincorporated village. The unincorporated village is controlled by the township council and is subject to all the provincial laws regulating townships. In addition to this the township council may apply to the unincorporated village certain privileges granted to councils of cities, towns and incorporated villages. These privileges apply mainly to the making and care of streets and bridges.

Incorporated Villages.—When by the census it is shown that there are 750 inhabitants occupying not more than 500 acres of land, a petition signed by not less than 100 residents and freeholders and householders may be presented to the township council to have the village incorporated separated from the township in which it is situated. After certain preliminary conditions have been fulfilled a by-law may be passed and the village thereby becomes an incorporated village.

At the end of 1895 there were in Ontario 137 villages having an area of 100,043 acres and a population of 136,021. The population averaged therefore barely 1,000 persons.

Police Villages.—There is a condition intermediate between that of an unincorporated village and an incorporated village known as "Police Village." The county council may on petition erect an unincorporated village into a police village. This gives the inhabitants the right to elect three persons known as police trustees whose business it is to improve the streets, construct drains and sidewalks, and to enforce certain statutory regulations in regard to the prevention of fire and explosions, and to prohibit nuisances. The police trustees get their money for expenditure from the township council by a special tax on the village.

Towns and Cities.—When the incorporated village attains a population of 2,000 it may become a town, and when the town attains a population of 15,000 it may become a city. The method of so changing is according to statute as follows: The council decides to apply for the change, and notice to this effect is publicly advertised for three months, application is then made to the Lieutenant-Governor-in-Council and in due time, if nothing interferes, the new town or the new city is proclaimed—the proclamation containing the name and extent of the municipality.

Sometimes, however, towns are ambitious to become cities before they reach the size of 15,000 in population. In such cases the incorporation must be got by means of a special Act of the Legislature. The number, size and population of the towns and cities of Ontario on December 31st, 1895, was as follows:

	Area.	Ratepayers.	Population.
96 Towns.....	146,308 acres	93,803	295,523
13 Cities	40,548 acres	115,161	416,215

The average population of the towns is 3,078, and of the cities 32,016.

It may be worth while to give the population of these 13 cities in 1895 in order of size :

1 Toronto.....	176,858	8 Guelph.....	10,716
2 Ottawa.....	49,017	9 St. Thomas.....	10,563
3 Hamilton.....	48,804	10 Stratford.....	10,365
4 London.....	34,429	11 Belleville.....	10,318
5 Kingston.....	17,955	12 St. Catharines.....	9,652
6 Brantford.....	16,314	13 Chatham.....	9,016
7 Windsor.....	11,549		

GOVERNMENT OF MUNICIPALITIES.

I have already referred to the government of unincorporated villages and police villages, so that we need now consider only townships, incorporated villages or villages as we shall call them, towns, cities and counties. In all cases the governing body is called a council, made up of representatives elected by the ratepayers or persons entitled to vote.

Township Councils. The council of a township consists of a reeve, who is the head of the council, and four other councillors. If, however, there are 500 qualified voters, the council consists of a reeve, one deputy reeve and three councillors; and for every additional 500 voters there shall be elected an additional deputy reeve instead of a councillor. The reeve is elected by the people along with the other councillors.

The council of a village is composed similarly to that of a township.

The council of a town consists of a mayor, who is the head of that body, and three councillors for every ward when the number of wards is less than five, and two councillors for every ward when there five wards and over. In addition there may be a reeve and one or more deputy Reeves for every 500 voters; In case however, the town has separated itself from the county, then the Reeves and deputy Reeves are not chosen.

The city council consists of a mayor, and three aldermen for every ward. This applies to all cities, except Toronto, which by special legislation elects a council of mayor and twenty-four aldermen, and also a board of control.

By an Act of the Legislature, in cities of over 100,000 population the council chooses from among its members three aldermen who, with the mayor, form a board of control. This board prepares the estimates and awards contracts for public works, nominates or dismisses officers of the corporation, and carries out any work transferred to it by vote of the general council. It will be seen that the board of control is the executive committee of the council. As Toronto is the only city having a population of over 100,000 it alone has a board of control.*

County Councils. Previous to the year 1897 the county councils were made up of the Reeves and deputy Reeves of all the townships, villages and towns not separated. As a consequence many of the county councils were large bodies. For instance, the council of Simcoe County was composed of fifty-eight persons. Other were nearly as large. It was thought that such bodies were unnecessarily large and expensive, and in 1896 the Legislature of Ontario passed *An Act to Reduce the Number of County Councillors*. By it the various counties were by commissioners (judges) cut up into "divisions" larger than townships, each division to elect two members, and thereby the number of councillors was reduced to a number not less than eight, and not more than eight according to the population. The members of the county council are elected for two years, and, as before, they choose a head known as a "warden." Another

*A very interesting and valuable sketch of the government of Toronto and the working of the Board of Control and the City Council may be found in an article on "Municipal Toronto" by W. D. Gregory, published in *The Outlook*, New York, Feb. 5, 1898.

innovation in this Act is that a voter having two votes in a division may, if he chooses, give both to one candidate. The effect of the new Act in the way of reducing the number of councillors will be seen from the following, which are fair samples :

County.	Number in Council 1896, under the old Act.	Number in Council 1897, under new Act.
Simcoe	28	18
Middlesex	46	16
Wellington	38	14
York	47	18
Stormont, Dundas and Glengarry	43	26

The reason for the last council exceeding 18 is that it is a union of three counties, having one common council. There are four such unions of counties in Ontario, viz., Northumberland and Durham, Leeds and Grenville, Prescott and Russell, and the one already mentioned, Stormont, Dundas and Glengarry. There is one other case that might be supposed to be a union of two counties, but that is not, viz., Lennox and Addington—this is one county with a double name. Thus we say “the county of Lennox and Addington,” but “the united counties of Northumberland and Durham.” All of these unions of counties are found east of Toronto.

We have in Ontario forty-three counties, one of which is a provisional county (Haliburton), having thirty-eight councils, and the northern and north-western townships are grouped in seven judicial districts, as follows : Muskoka, Parry Sound, Nipissing, Algoma, Manitoulin, Thunder Bay and Rainy River. These districts have not a county council, but have over them certain judicial officers appointed by the Crown. There is a special Act of the Legislature dealing with the organization of townships in these judicial districts. The powers and regulations of the township councils are, however, on the whole the same as in townships within the organized counties.

POWERS OF MUNICIPAL COUNCILS.

The powers of the various councils are laid down by the Statutes, and are too extensive to permit of being stated clearly in condensed form in a paper limited as this. Where, however, a matter concerns a township in particular it is handed over to the township council. When the matter is of more general concern it becomes a duty of the county council. Thus, the maintenance of the shorter connecting roads belong to the townships, whereas the maintenance of certain through roads and connecting bridges would more properly belong to the county councils. Most of the roads are now maintained by the townships. The county council is called upon to maintain a county gaol, the township provides the money for public schools, and the county is concerned in high schools.

TAXES.

To carry on its work every council requires funds, and this money is raised largely by means of taxes. From the Legislature there is derived a portion of the funds for educational purposes ; also a share of fines and grants for the enforcement of justice, and occasionally grants for special purposes, such as the erection of county poorhouses. In the main, however, the money required is derived from taxes imposed and collected annually.

Every city, town, village and township imposes its own taxes, but the taxes of the county are imposed by the various municipalities composing the county. Thus, in one tax bill, the farmer pays his township rate, his school rate, and also his county rate. The township treasurer turns over to the county treasurer the county taxes so collected. In order that an equality of taxation may exist the county council adjusts or equalizes the assessment of the various municipalities composing the county, and fixes the general county rates to be imposed and collected. Thus we see that the county council decides upon or adjusts the total assessment for each municipality composing the county, and fixes its own rate to be imposed. The township, town and village municipalities appoint the assessors, fix their own rates of taxes, and the collectors of taxes appointed by the townships, towns and villages, collect the taxes and turn over to the treasurers of these several municipalities the money to which they are entitled.

The public schools are managed by "Boards of Trustees," elected by the people. Every city, town and village has one board of trustees, but in the case of townships there is a division into school sections. The boards of trustees make up their estimates, and the council of the township, village, town or city levies a special rate to meet this requirement. The council, however, is responsible, and all debentures issued for the erection of school-houses are issued by the council. The trustee board is merely a custodian of the funds, and although elected separately by the people, is, in a manner, a committee acting for the council in school matters.

THE FINANCES OF THE MUNICIPALITIES.

You may now wish to know something as to the financial results of municipal government. Every council has a clerk who does the work of a secretary, and has also a treasurer. Sometimes, especially in the case of townships, these officers are united in one man, though that is undoubtedly false economy.

At the first meeting in every year the council is required to appoint two auditors, one nominated by the head of the council and the other by the members of the council, and within one month they must present to the council their statement of audit of the accounts of the municipality for the previous year, ending December 31st.

In this connection it may be stated that the nomination for the council is held in all municipalities of the province on the last Monday of December and the election takes place on the first Monday of January, and in order that the electors may be in possession of most of the facts as to the financial standing of the municipality at that time it is necessary for the treasurer and the head of the municipality to publish in the papers a preliminary financial statement up to December 15th of the current year.

Provincial Municipal Auditor. In Ontario, as elsewhere, some councils have not been careful in requiring the books to be kept in a satisfactory manner. Some treasurers have been negligent and even dishonest, and some auditors have failed in doing their whole duty. To remedy this the Legislature at the session of 1897 made provision for the appointment of a provincial municipal auditor, whose duty it is to devise a uniform system of keeping municipal books that may be adopted by all similar municipalities, to inspect the treasurers' books from time to time, and to be able to respond to the requests of councils and treasurers who may desire advice in their financial transactions. This official has been appointed and already finds his time fully occupied.

Next comes the question as to how the public and students of municipal finance may acquire information as to the financial state of affairs of all the municipalities.

1st. The clerk of every municipality is required to furnish to the secretary of the Ontario Bureau of Industries, at Toronto, who is attached to the Department of Agriculture, any information asked for from the assessment and the collection rolls.

2nd. The auditors are required to send to the same official a copy of their certified audit at the time of its completion.

3rd. The treasurer is required to make a return once a year of the financial transactions of the year, such as the receipts and expenditures, the assets and liabilities, on such forms as the secretary of the Bureau provides for that purpose.

These returns are received and examined as far as possible, and, if incomplete, or if they require further explanation, are amended and corrected by correspondence. When satisfactory these statements are published in tabulated form as one of the reports of the Bureau. These reports now cover the years 1886 to 1896. The report that was put out in 1896 covers 152 pages, and includes statistics of assessment and taxation, population, receipts and expenditures, assets and liabilities of all the municipalities of Ontario, viz. :

492 townships, 96 towns, 137 villages, 13 cities and 38 counties.

By way of conclusion I give the grand totals of all these municipalities as follows :

Year.	Popula- tion.	Total assessment.	Taxes imposed for all purposes.			Bonded debt.		Floating debt.	Interest paid on loans and debentures.
			Total.	Rate per head.	Mills on the dollar	Total.	Rate per head.		
		\$	\$	\$ c.		\$	\$ c.	\$	\$
1896.....	1,972,286	814,917,633	12,122,785	6 15	14.88	*		*	*
1895.....	1,957,390	821,466,166	12,316,429	6 29	14.99	51,895,991	26.51	5,834,129	2,578,220
1894.....	1,936,219	826,179,370	12,320,312	6 36	14.91	49,724,557	25.68	6,659,567	2,552,607
1893.....	1,910,059	825,530,052	12,512,660	6 56	15.17	48,083,243	25.17	6,796,422	2,508,621
1892.....	1,909,527	825,211,127	11,803,570	6 18	14.30	47,166,962	24.70	6,469,899	2,482,156
1891.....	1,922,121	818,847,394	11,767,748	6 12	14.37	43,888,853	22.83	7,629,730	2,498,294
1890.....	1,917,544	798,616,271	10,897,485	5 68	13.65	40,720,985	21.24	8,387,186	2,240,692
1889.....	1,906,901	761,905,816	10,248,198	5 37	13.45	38,988,332	20.44	6,493,519	2,057,938
1888.....	1,880,145	748,654,570	9,919,962	5 28	13.25	34,729,527	18.47	6,437,363	1,999,760
1887.....	1,848,457	717,311,938	9,300,113	5 03	12.97	31,943,320	17.28	5,645,208	1,820,590
1886.....	1,828,495	694,380,659	9,009,385	4 93	12.97	29,924,863	16.37	4,841,717	1,715,620

*Statistics for 1896 are not yet complete.

C. C. JAMES.

THE DEVELOPMENT OF AGRICULTURE IN ONTARIO.

The great primary sources of wealth in this country are four¹ in number—our fisheries, our mines, our forests, and our farms. From our Canadian fisheries we derive annually wealth to the amount of \$20,000,000²; from our mines nearly \$30,000,000³; from our forests about \$80,000,000⁴, and from our farms, according to the Dominion census, no less an amount than \$600,000,000. We may then start out by stating that agriculture is the most important industry of Canada to-day—we are to a large extent “a nation of farmers.” Let me put the matter in another form: For ever dollar of minerals produced last year in Canada there was over \$20 worth of farm products added to our wealth. The wheat crop of Ontario alone last year was worth nearly as much as all the gold, silver, copper, nickel, coal, iron, salt, petroleum and other minerals of the whole of Canada. When we keep facts like these in mind we can readily understand why the managers of banks and loan companies are close students of agricultural statistics and why the values of bank stocks in Canada are so closely affected by the yield per acre of our staple field crops and the prices of the same in the great markets of the world.

As students of political economy, you have doubtless observed the remarkable improvement in the market prices of many Canadian stocks during the past year, and you have also, I have no doubt, placed side by side with that the improvement in the price of wheat, cheese and live stock. It does not take a student of extraordinary ability to trace the connection between the two and to know which was the one that affected the other.

Let me close this brief statement of the importance of agriculture in Ontario by giving you the following figures:

The capital invested in Ontario in agriculture is about \$900,000,000.

The persons engaged in agriculture in Ontario in 1891 numbered 292 770⁵.

The annual agricultural product in Ontario is over \$200,000,000.

Size and Location of Ontario.

Ontario is a large province. From the mouth of the Albany River on James' Bay to Pelee Island in Lake Erie, the distance is about 750 miles; while from the eastern limit on the St. Lawrence to the western, near the Lake of the Woods, it is about 1,000 miles. Its total area is 220,000 square miles: larger than the nine North Atlantic states by one-third; larger than Maine, New Hampshire, Vermont, New York, Pennsylvania and Ohio combined. But a small portion is, as yet, settled, in fact eighty per cent. of the entire province is yet in the possession of the Crown, and while the larger portion unsold is valuable principally for its timber and minerals, there are several millions of acres of the finest agricultural land as yet unoccupied. One section lies along the Rainy River, adjacent to Minnesota; the other, the valley of Lake Temiscamingue, is to the north of Ottawa. These two districts are in the same latitude as Northern Minnesota. The former district is covered with deep, black, alluvial soil, and the other with rich clay overlaid with humus.

The old settled portion of Ontario lies in the triangle, bounded on one side by the Ottawa and Lake Nipissing, on the second by the St. Lawrence, Lake Ontario and Lake Erie, and on the third by the St. Clair, Lake Huron and Georgian Bay. It is worth while opening a map to look at the configuration. With the exception of a short portage between Lake Nipissing and Trout Lake on the north, it is practically an island, washed by the waters of two large rivers and three

Notes to this paper will be found beginning on page 38 and are referred to by number.

great lakes. In addition note its shape, like a wedge pushed down into the heart of the great agricultural states, and you will begin to realize that its position and surroundings apparently fit it for a great agricultural land. Its backbone is the western branch of the Archean rocks, the material out of which rich clay is made. The alluvial deposits are most noticeable in the extreme southwest, where the soil rivals that of the richest prairie. While the northern point of Ontario is an ocean port on James' Bay, the southern point is further south than Boston and Chicago. The southern limit of Ontario is below the 42nd parallel; the northwest boundary line of the United States is the 49th. Practically all of the 2,114,321 inhabitants of Ontario are to the south of a straight line drawn from the Soo to Portland, Maine. In this area are 23,000,000 acres of occupied lands.

The People of Ontario.

Next let us refer to the people who have settled this favored region. We are, I think, apt to consider the people of this province as a homogeneous class. We are probably becoming such at a rapid rate; but the early settlement of this province was varied, varied in its source or origin and varied in its nature, and at the present day we have a variety in the agricultural methods and products of this province that is quite interesting to study. Why is it that one county is to-day noted for its fine beef cattle, another for its sheep, another for its fruit, another for its cheese or butter? Climate and soil have much to do with this; but the people who first came, bringing the agriculture of their original homes with them, have also much to do with it. It would be interesting to trace these influences had we the time and ability. If I could throw upon a screen here before you a picture of a farm settlement on the St. Lawrence below Brockville, another of a group of farms in the German settlement of Waterloo Co., another of a fruit growing section between Hamilton and Niagara, another of the Paisley Block in Wellington, another of a French settlement in Essex, you would hardly believe that they all represented different sections of the same province, and you would admit that the nationality or origin of the people had much to do with their condition. We would, I think, find it an interesting study to trace the present agricultural methods back to their source in such sections as the old U. E. L. settlements from New York state along the St. Lawrence, around the Bay of Quinte and in the Niagara peninsula, in the Highland settlement of Glengarry, the settlement of English gentlemen and retired military officers near Cobourg, the Irish settlement near Peterboro, the military settlement near Perth, the Talbot settlement in Elgin, the Canada Co's settlement in the Huron Tract, the block of Paisley Weavers in Wellington, the Germans in Waterloo, Huron and Renfrew, and the French Canadians in Essex, Prescott, Russell and along the C.P.R. west of Mattawa. We would find in these various sections many social customs and methods of agricultural life still traceable to the countries whence the first settlers came.

Epochs of Agricultural History.

We might divide the agricultural history of Ontario into epochs as follows:

1st	From 1783 to 1812.
2nd	From 1812 to 1837.
3rd	From 1837 to 1867.
4th	From 1867 to 1897.

These periods are of nearly the same length, about thirty years—a generation each. In the first period the work consisted mainly in felling the forests to make an open place for the rude log houses and barns and the small field in which the wheat, oats and potatoes might be grown. The farms were well described as "clearings" and the cleared ground among the stumps served

to produce only enough grain and roots to sustain the settler's family. Cattle were few in number and the settler had to add hunting and trapping to his occupation of felling and tilling in order to supply his family with meat and clothing. In that period the two principal articles exported from the farm were oak and pine timber and wood ashes. Reference to the early trade records⁹ will show how important these two items were in the export trade of Upper Canada. The clearing of land and the making of potashes for export is an industry but little known to the farmers of to-day. The student of the industrial history of Canada will find an interesting theme in the description of this practice. Interesting accounts are to be found in some of the early records of backwoods life in Upper Canada. Potash making, of course, was to be found even at a comparatively recent date in the wooded townships lately settled. For instance, I have been told by a resident of the midland counties of western Ontario that he recollects well when over a considerable area "black salts" was the common currency or medium of exchange. With the increase in cleared land came an increase in the area of land sown to grain, especially to wheat. This grain had arisen to extraordinary values during the continuance of the great war of 1812-147, and this doubtless gave increased impetus to its cultivation. An investigation of the trade returns of the second period, 1812-1837, will show an increasing export of wheat to Europe by way of Montreal. Down to 1875 the exports of Montreal may be taken as practically those of Ontario alone, for Manitoba and the Northwest had not yet become exporting sections. Ontario produced as fine wheat as was to be found in North America—both spring and fall—and she has probably kept up her record in this regard better than any other part of the older settled portion of this continent.

From 1783 to 1812 the population⁸ had grown from practically nothing to about 80,000 persons, all of whom, with the exception of a few hundred, were directly connected with agriculture. From 1812 to 1837 the population increased from 80,000 to 397,489. By far the larger portion of this population lived upon the farm. We find on reference to the year 1830 that there were only five towns in the province of over 1,000 inhabitants each, viz., Brockville, 1,130; Hamilton (including township), 2,013; London (including township), 2,415; Toronto, 2,860, and Kingston, 3,587.

In 1830 there was only one daily paper in Ontario and only one bank. Even matches, steel pens and postage stamps were as yet unknown. The first telegraph line from Toronto to Niagara did not appear until 1847, and the first railway train from Toronto north to Bradford did not run until 1853. Railway connection with Montreal by the Grand Trunk came three years later, in 1856. Even the canals along the St. Lawrence were small and of simple construction. The farm exports of the province went down the St. Lawrence in Durham boats and batteaux.

During the third period, from 1837 to 1867, an extensive immigration set in to this province from England, Scotland and Ireland⁹. The great famine in 1846 sent Irish immigrants to America by the tens of thousands. These new comers settled, as a rule, in groups or blocks and formed the nuclei of some of the richest townships of Ontario. These Old Country settlers came from the British Isles where the love of live stock is so marked. I have not time to refer to the development of the pure breeds of live stock—horses, cattle, sheep and swine—in the British Isles. You will find an interesting sketch of it in that well known work *The Pioneers and Progress of English Farming*, by Rowland E. Prothero (Longmans, Green & Co., 1888). Its development added untold wealth to Great Britain, and the names of such men as Bakewell, Collings, Booth, Bates and Cruickshank should be recorded in gold in Westminster Abbey.

The love of the British for live stock is a marked characteristic and must be reckoned with in considering the growth of wealth of all their descendants. It presents a very interesting theme for investigation and discussion. We sometimes attribute British wealth to coal, sometimes to ships of oak and of steel, but the picture of John Bull moving about among

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his flocks and herds is one that appeals to me with equal force. The Scotch laddie with his faithful collie watching his flock of sheep and the sturdy Englishman driving his bunch of fat beeves to market must not be forgotten in studying the development of British prosperity. Nor must we forget that the Queen is mistress of her Royal flocks and herds and sets a noble example followed by the Prince of Wales and the Duke of York. These immigrants from over the sea, especially those from Aberdeenshire and the south of Scotland, and those from Northumberland, Durham, Yorkshire, and the great sheep downs of the south of England, brought with them the love of good horses, good cattle, and good sheep, and the pure bred stock soon followed. An interesting story could be told of the first extensive importation¹⁰ brought out in 1833 by Mr. Rowland Wingfield of Guelph, an English settler, who chartered a boat, crossed the ocean, sailed up the St. Lawrence, ascended the Ottawa, came down the Rideau Canal and landed his stock at Hamilton, and then drove them on foot to his farm in Wellington Co.

Ontario, by her sunny skies, clear air, clean water, and rich pastures, has been well adapted to the rearing of live stock. The settlers from England and Scotland not only loved good stock, but knew how to care for them, and in this period the true foundation of Ontario's agricultural wealth was laid. Where do we stand to-day, thirty years later? I can put it in a few words. As was proven at the World's Fair in 1893, there is no other part of the north American continent where so great a variety of the best of pure bred stock is to be found to-day as in the Province of Ontario. Any one who doubts this can have convincing proof of it by visiting the magnificent gatherings of live stock brought together every fall at the exhibitions held in Toronto, London and Ottawa, and at the winter shows held at Guelph and elsewhere by the Fat Stock Associations. What is its extent? Let me give it to you in figures:

Total value of live stock on the farms of Ontario, July 1st, 1896 . .	\$96,857,566
Total value of live stock sold for year ending July 1st, 1896	\$28,750,000
Total value of dairy products made in Ontario every year.	\$27,000,000

We now come to the fourth period, the thirty years just ended, 1867-1897. The main feature of this period is the rise of dairying as a specialty—it is the age of the coming in of the cheese factory and the creamery. In 1851 the first co-operative cheese factory had been started near Rome in Oneida Co., New York State, and soon after factories sprang up by the score in the Hudson valley and to the west and north. In 1864 Harvey Farrington, of Herkimer Co., New York State, with commendable enterprise crossed over into this Province and started the first factory at Norwich in Oxford Co. By 1867 there were half a dozen more. In 1883 the number had grown to 635, and in 1896 there were in operation no less than 1,147 that produced 104,000,000 pounds of cheese. The gross value of the factory cheese made in this Province last year was approximately \$12,000,000.

A word or two as to the co-operative companies¹¹. The farmers of a township desire to organize a company. Half a dozen or more draw up an agreement in accordance with a special Act passed for the purpose and register the agreement at the local registry office. Sufficient money is subscribed to erect a factory and equip it. A committee of management is appointed. Fifty or more farmers agree to send their milk daily to the factory where it is made into cheese or butter by an expert. Careful record is kept of the milk supplied by each patron, and also of its quality in value for cheese or butter. The products are sold and the surplus, after taking out the cost of making and selling, is divided among the patrons according to the amount of milk that each patron sends. In 1896 there were 57,635 patrons of the 1,147 cheese factories.

Following the success of the co-operative cheese factory has come the co-operative butter factory or creamery. Inside of ten years it is probable that the making of dairy butter at home will become as rare as is the making of cheese at home, and a factory system of butter making will

be established far greater in extent and importance than is our present cheese factory system. I say "far greater" because the consumption of butter exceeds that of cheese.

So much for the main characteristic of our agriculture in each of the four periods referred to. The tree felling, log hauling and burning and potash making of the first settlers gave way to the grain growing of the second period: then followed the great boom of live stock development, and out of this has come our dairying so extensive and so remunerative. If we were to ask what else is now being developed, I might refer to the opening up of a great fruit growing industry.

Four causes have contributed much towards the development of our agriculture. These have been felt in all lands, but I will refer principally to their effect upon our own country. They are:

1. The increased use of machinery.
2. Improvements in means and methods of transportation and communication.
3. The application of scientific discoveries.
4. Changes in methods of work and the introduction of co-operative associations.

The use of machinery.

Between 1881 and 1891, the decade between the two last census enumerations, there was a large increase in the cultivated area of Canada, owing mainly to the settlement of the prairie lands of Manitoba and the Northwest. In that period the wheat area of Manitoba alone increased from about 200,000 acres to 900,000. The Dominion statistician, in census bulletin No. 18, says that "contemporaneously with this decrease," of farmers and farmers' sons in Canada "there has been an increase in the amount of land improved from 21,899,180 acres in 1881 to 28,537,242 acres in 1891." The agricultural product of 1891 was far in advance of that of 1881. Yet if we turn to the farm producers we find the following statement:

	1881	1891
Farmers and farmers sons in Canada.....	656,712	649,506

Here is a falling off to the extent of 7,206 accompanied by the very large increase in the improved land of 6,638,062 acres. There are fewer persons engaged in agricultural work in Ontario to-day than there were ten years ago, but the product of their work is much greater. The agricultural statistics of our Ontario Department go back only to 1883. Let me put the statement in the form of a table:

	1883	1896
Total farm lands.....	21,458,067	23,172,408
Acres of field crops.....	7,542,623	8,511,444
Value of farm land.....	\$654,793,025	\$557,468,270
Value of implements.....	\$43,522,530	\$50,730,358

We have therefore an increase in farm lands of nearly 2,000,000 acres, an increase in the cultivated land of just about 1,000,000 acres; a decrease in the value of farm lands of nearly \$100,000,000, but an increase in the value of farm machinery and implements of over \$7,000,000. At the same time there has been a very marked falling off in the price and cost of machinery of all kinds. We conclude therefore, that in the past thirteen years, for which we have statistics, there has been a very great increase in the machinery, implements and tools used upon the farms of this province. This explains why it has been possible for a smaller number of workers to increase their total product.

Perhaps you will allow me to illustrate this with some examples to which you can add from your own observation and experience. The potato, tobacco, corn or maize, and the tomato are

natives of America and can be traced back to their original source on this continent. But in the case of wheat, barley and other grains we are still very much in the dark as to their origin. Go back as far as you can, you will find in history and in archaeological remains the instruments for reaping have been shaped something like the curved arm, the sickle, and yet it was only the other day the sickle went out of use among civilized people. From the time that wheat and barley and oats were first produced until within a few years ago, the sickle, with practically little or no change, remained the principal reaping instrument of the human race. About 1826 a Scotch minister named Bell presented for examination to the Highland and Agricultural Society of Scotland a new machine, the forerunner of what we now know as the reaping machine¹². About the year 1831 Cyrus McCormack brought out the first reaping machine in the United States. It was not until the year of 1841 or 1842, after ten long years of changing and testing, that his machine was finally put upon the market. It is only within the last fifty years that the sickle, the scythe and the cradle, after being used for so many centuries, have been superseded by the reaping machine. All at once what wonderful developments began. The reaper and the mower, and then a very few years ago came the self-binder, and we have to-day in California the harvester and header, a machine drawn by from eighteen to twenty-four horses or mules, which reaps and threshes the grain and leaves it in bags on the field. The question we ask ourselves right here is, "What next?" One hesitates to give an answer to that question when we see what has happened, what wonderful steps in progress have been made from the simple sickle and scythe to the self-binder. When within the period of thirty or forty years such wonderful evolution has taken place after a long period of quiescence, one may well say, what will be introduced next?

Take another instance. In connection with dairying, the method in olden times of churning the milk was by a very simple operation, either by means of a bag hung up and pounded or swung around, or else in a vessel quite similar to our old-fashioned barrel churn. It is not very many years since the old-fashioned dash churn and implements of this kind were used for the manufacture both of butter and of cheese. Then came the application of power, such as dog power, horse power, steam power, the introduction of the box churn and one after another applications of various kinds of machinery began to be made, till now what have we to-day? We have a machine that can be set up in the barn to milk the cows. Although this machine is in an imperfect condition, nevertheless it does its work and proves we are on the right track. The milk drawn by the machine can now be put into another machine and separated, the skim-milk coming out of one spout and the cream out of another. This cream can be put into another vessel or machine, and by proper temperature and the addition of a substance somewhat resembling yeast, a fermentation can be started, and just that kind of fermentation that we desire in connection with it. After the fermentation has gone on a certain time this cream can be put into another machine and churned, and after churning it can be worked and packed by machinery. So that now it is possible, although not perfectly practicable, to do the whole of the work by machinery, from the very milking to the putting of the finished article on the market. This wonderful progress has taken place within the last quarter of a century.

The part played by machinery in agricultural work is referred to in an article on "Industrial advance of Germany" by W. G. Mulhall in the *North American Review* for January 1898. Mulhall estimates the value of German rural products in 1895 at \$2,002,000,000. He says: "The sum total is fifty million dollars less than the value of farm products of the twenty-three western States of the Union, but the number of hands in Germany is two and a half times as great, while the improved area of the Western States is three times that of Germany. In Germany the productive area is equal to no more than eight acres per farming hand; in the Western States it is sixty-two acres. The value of product per acre is, of course, higher in Germany.

namely \$31, as compared with \$10 in the Western States, but the product per farming hand is \$620 in the latter against \$250 in Germany. He gives two reasons for this great difference, viz., the greater use of improved machinery on the large farms of the U. S., and the military system of Germany which "takes from agriculture the flower of the peasantry."

Many interesting chapters have been written on the development of the primitive plow that consisted of a sharpened tree crotch drawn by one or two cows or oxen, and that merely scratched the ground, to the modern steel plow with its removable and adjustable colter and mould board. We might contrast the old Scotch plow, drawn by twelve oxen and requiring two or more men to manage it, and the modern sulky plow drawn by a smart team of horses turning three or four furrows at once and all controlled by one man who rides upon it, sitting upon a spring seat. This is a development with which you are all more or less familiar. It might be advisable here, however, to refer to the fact that the improvement consists entirely in the form and efficiency of the implement rather than in the mode of its working. There is still a great opportunity for producing a soil-working implement that will do its work by turning the soil on the principle of the spade or the fork instead of on the principle of the past forty centuries, dragging a heavy implement through the soil and overturning the latter by main force.

We might refer to the great improvements in harrows for pulverizing the soil, in seeders and drills for sowing the seed, in threshers and cutters and pulpers for preparing the products of the field for use, and the recent revival of the old-time silo for preserving perishable food for future use. I would direct your attention to the fact that at the present time great attention is being paid to the erection of cold storage warehouses for preserving the fruits, butter and cheese and meats coming from the farms, to the providing of refrigerator cars on the railroads, and refrigerator compartments on our steamship lines, so that within a very short time we hope to be able to place these perishable articles in a fresh and attractive form on the great consuming markets of Europe. The successful carrying out of this undertaking will be one of the greatest boons to Canadian agriculture—in fact it is an absolute necessity to the present welfare of our agricultural industry, to say nothing of the effect upon its future prosperity.

The application of machinery to agricultural work is rapidly bringing it into line with the great manufacturing industries, and when we consider its possible development as a manufacturing industry many questions present themselves, of interest to the student, such as

Will agriculture be broken up or divided into special lines of production?

What part will electricity play in future work and how will agriculture be affected thereby?

What will be the effect when the farmer is enabled to erect a windmill and store up the free energy of the wind in a storage battery, whence at will he can heat or light his house, pump his water and drive his machinery?

How will the increasing use of machinery affect the ownership of farm lands? Will the tendency be towards larger proprietorships or towards smaller holdings?

Will the increased use of machinery raise the farmer intellectually and socially or will it tend to reduce him more and more to mere drudgery and servitude?

Some say that the use of machinery has driven thousands from our farms: others say that machinery has been brought in in larger quantity to take the place left vacant by the men who have left the farm for the city. The relationship of machinery to men in agricultural work is a question that might be discussed at great length, but we must leave this part of our subject for our next.

Improvement in Transportation Facilities.

The history of transportation development in Ontario would be a concise history of the social and material progress of the people. The first settlers travelled by canoe or Durham boat or overland by the Indian trails^{1,2}. The settlers' roads followed these trails at first, being

straightened and improved in after years. The corduroy road of the settlers' own making and the two or three military roads constructed in the latter part of the 18th century, were the principal avenues of bringing out supplies to the lake front for transportation by sailing vessel down to the rapids of the St. Lawrence.

Let me make a quotation from the report of the Instructor in Road-making for Ontario :

"The first serious attempt at road construction in Ontario was commenced immediately after the separation of Canada into the Upper and Lower Provinces in 1792, and was one of the chief considerations of Lord Simcoe upon his arrival as first Lieutenant-Governor. At the first Parliament in 1793, a statute labor law was passed, in spirit very similar to the present law. Guided by his military ideas, which prompted him to see in the present site of London the future capital of the Province, in Chatham a naval dock yard, in Turkey Point and Penetanguishene, naval stations, he accordingly planned a system of military routes. When on one of his tours of exploration he stood on the present site of London, then known merely as the 'Forks of the Thames,' in the midst of an unbroken wilderness, and proclaimed his intention of opening a road 'straight as the crow could fly' to the Head of the Lake (Burlington Bay). Work was commenced on this road on September 10th, 1793, by a detachment of the Queen's Rangers. This was first called Dundas Street, but is now known as the Governor's road. From the Provincial seat of Government, York, now Toronto, Yonge Street was opened to Lake Simcoe by troops, a work which was completed in February of 1796. It was the intention of Simcoe that the road through the Province from York to Kingston should be opened by the settlers, and travel from the latter place to Montreal was for a time to be by water. Had Simcoe remained as Governor, it is altogether probable that the work of opening roads would have been carried on more energetically, but with his recall in 1796 ended very largely the era of military construction."

The Danforth Road from York eastward was begun in 1793.

"By 1796 there were roads from Montreal to Lake Francis, and from Cornwall to Prescott. The intermediate stage of about fifty miles was travelled by boat owing to the wet water-front in Glengarry, and the consequent difficulty of constructing a road. As late as 1807 the mails were carried from Montreal to Toronto, Niagara and Amherstburg, by pedestrians who carried an axe to assist them in the journey. In 1816 the first stage was run between Montreal and Kingston, and in 1817 a stage ran between Kingston and York. This, however, was only in the winter, and during summer navigation the stages were discontinued. In 1826 the first stage passed between Niagara and Toronto, and in 1828 a stage route was established between Ancaster and the Detroit River."

During the second period the construction of canals¹⁴ around the rapids of the St. Lawrence greatly improved the communication with Montreal and assisted the farmer with his freight to Europe. About the middle part of the 3rd period railway construction began, and for 45 years the iron and steel rails have been insinuating themselves through the farm settlements, and the iron horse has been pushing himself more and more into the very heart of the farmer's business. The benefits of railway communication for the handling of farm produce and for bringing in farm necessities are so well known and understood that we need not delay to discuss them. Improvement in road communication tends to remove the inequalities in farm value due to location or situation. I have seen the statement made by an Australian official that a tub of butter can be taken from Sydney to London for less than it could be brought from some remote part of England or Scotland. Two factors are just now entering into farm operations that demand your attention and that should be closely followed by you. The first is the movement already inaugurated in this province for the improvement of our rural highway, and second the construction of

light electric railways through rural parts for the benefit of the farm community. The trolley system is only ten years old, already we find several city lines gradually extending their operations into the adjacent townships. When the farmer can deliver his goods for market at his own gate and can be carried into town at the rate of 20 miles an hour, transact his business and return with his purchases with the loss of but a couple of hours, and no charge for wear and tear of horses, harness and vehicles, we shall see a new social and financial condition of agriculture. Let me refer you to one example. An electric road runs from Hamilton through the Grimsby fruit district, cars pass the doors every 20 minutes. Fruit can be loaded at Grimsby or Winona and shipped to Montreal or Winnipeg without change. Fruit lots at Grimsby have sold as high as \$500 an acre. In that section also the fruit-growing farmers have telephones in their houses, and can follow the market prices closely. Other questions for consideration are the use of bicycles in rural sections, and the daily free delivery of rural mails. The consideration of the effect of improved transportation upon agriculture should be of intense interest to you as students of political science. A fruitful field of speculation lies before you in trying to work out the effect of the present promised progress of the next quarter of a century. Let me give the following statement from M. Tisserand, late Director General of Agriculture in France, it will give you, so to speak, the other side of the picture—the European. It is taken from a paper lately presented to the Recess Committee of the British House of Commons on Irish affairs.

“Formerly, tradition, handed on from father to son, sufficed the husbandman for the advantageous utilization of the soil. The methods of culture were simple; it called for no great effort of the mind to till well, to regulate the rotation of crops and the breeding of live stock. Everything went on in a restricted circle, and the son, working as his father before him had done, was able to live comfortably and bring up a numerous family. To-day the situation is no longer the same. In this extraordinary century, when everything has been profoundly modified by steam, when distances have disappeared, and the Australian with his wool, the Indian with his corn, the American with his cattle and his dead meat, can reach the markets of Europe at less cost than it took the farmer of Yorkshire at the beginning of the century to get his produce to London, old methods and paternal traditions have become insufficient for the struggle which has to be carried on against foreign competition. It is no longer the struggle for life between man and man which is in question; it is the struggle for existence between industry and industry, between agriculture and agriculture, between country and country.”

“The struggle which agriculture has to sustain is all the more intense and severe because it has been less prepared for it. The formidable transformation brought about by the progress of railways, navigation, and the telegraph has had a greater effect on agriculture than on any other industry, because it has been surprised, so to speak, in the midst of the calm and quietude which it had been enjoying. It is no doubt a great boon to humanity that the products of the earth may overflow with an extreme facility from the regions in which they abound to the countries which need them; that every individual is assured his daily bread, and has no longer to fear the horrible famines which in other times periodically decimated the population; that, thanks to Australian wool and to the vast pasturages of the New World, the working man can obtain cheap clothing and cheap food to protect him against infirmity and give him health and strength. But if these are results to be thankful for from the humanitarian point of view, it is nevertheless true that they have had upon agriculture, through the general lowering of the prices of produce, an action which has placed it in a critical situation, and which has thrown the cultivators into confusion and brought discouragement and despair among the rural population. All thoughtful minds, the public powers, and governments are occupied with these considerations. In all directions it is felt that the agriculture of Europe is like an old and leaking ship, tossed and

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buffeted about upon a sea of breakers, and that, to save it from foundering, it needs to be steered by abler hands and navigated by pilots who will join to a thorough practical training a profound and extensive scientific knowledge."

The Effect of Scientific Investigation upon Agriculture.

The art of agriculture is as old as man, but the science of agriculture has not yet completed its first century.

It seems at first though impossible to believe that before the nineteenth century dawned Agricultural Science was to even the most advanced scientific workers and explorers a "dark continent." In 1804 De Saussure published a work entitled "Recherches sur la Vegetation," in which he gave the analysis of the ashes of many plants, and contended that they were absolutely essential to the growth of the plant, that they must be derived from the soil, and that probably these ash or mineral constituents that the plant derived from the soil were the source of those found in the animals which fed upon the plants. From 1802 to 1812 Sir Humphrey Davy delivered several series of lectures which he published in 1813 under the title "Elements of Agricultural Chemistry." To him is due the credit of making the first attempt to reduce agricultural knowledge and investigation to a scientific basis. The work of these two men, together with that of Thær, Sprengel and Boussingault, prepared the way for the magnificent work of Liebig, whose publications appeared in 1840 and 1842, since which time many of the brightest minds in Europe and America have been investigating the composition of soil, plant, and animal, and their relation to one another.

Davy said: "Discoveries made in the cultivation of the earth are not merely for the time and country in which they are developed but they may be considered as extending to future ages, and as ultimately tending to benefit the whole race, as affording subsistence for generations to come; as multiplying life; and not only multiplying life, but likewise providing for its enjoyment."

Liebig in one of his productions wrote: "I shall be happy if I succeed in attracting the attention of men of science to subjects which so well merit to engage their talents and energies. Perfect agriculture is the true foundation of trade and industry—it is the foundation of the riches of states."

Chemistry was the first science that came to the assistance of agriculture, and ever since agricultural science has been largely built upon agricultural chemistry as a foundation.

In 1840 a few farmers of Mockern, in Germany, formed themselves into a sort of club or society and decided to seek the assistance of a chemist in the selection of their special fertilizers. From this have sprung all the experiment stations and agricultural laboratories of the world. I shall not here trace their spread through Germany, France, and the British Isles, how they sprang up in the U. S. and Canada. Agricultural science in Canada dates from 1874 when the Agricultural College and Experimental farm were started at Guelph. To give you some idea of the work now in progress let me enumerate the leading institutions of this nature in Ontario. We have as stated, the College and Experimental Farm at Guelph, three dairy schools, ten fruit experiment stations and a system of experimental work directed from Guelph and carried on in 1897 by 3,835 farmers located in all parts of Ontario. We have the Dominion system of experimental farms, with the central farm at Ottawa and four branches in other provinces, a dairy school and several training colleges in Quebec, dairy schools in New Brunswick and Manitoba, and a horticultural school in Nova Scotia.

I have already stated that chemistry was the foundation of agricultural science. Its application in connection with soils and fertilizers, foods, and feeding, and with dairying is readily

comprehended. A large portion of the work in other sciences could not be carried on without the assistance of the agricultural chemist. Perhaps one illustration of the value of chemistry may be sufficient for our present purpose. The beet sugar product in Germany has increased from 360,000 tons in 1876 to 1,620,000 tons in 1896. The average product of beet roots is about 10 tons to the acre. In 1876 the 10 tons produced less than 2,000 lb of sugar, whereas in 1896 the same weight produced 3,000 lb, in other words the beet-root of to-day contains over 50 per cent. more sugar than it did 20 years ago. To the agricultural chemist belongs the larger portion of the credit for this marked improvement.

Botanists are at work studying the plants of the world, and helping in the production of new varieties and the improvement of old varieties. Let me give you but one example of the value of this. About 6,500,000 acres in Ontario are devoted to grain growing. If by selection and cross fertilizing we could obtain seed grain that would add only one bushel per acre to our crops, our annual grain product would be increased by 6,500,000 bushels. The grain crops of Ontario in 1897 were worth over \$50,000,000. An improvement to the extent of 25 per cent is quite within the range of possibility. The President of the Agricultural College in his report for 1897, referring to this work in improving varieties of grain, says: "In this way some excellent foreign varieties have been introduced, tested, and distributed throughout the province—varieties which yield from six to eight bushels per acre more than any varieties previously grown. In oats and barley alone, the varieties introduced and distributed by the experiment station have, within the past four or five years, paid to the province a good deal more than the entire cost of the College for the last ten years."

Entomologists are studying the thousand and one insects and diseases affecting our grains and fruits. One practical example will perhaps best illustrate the value of Entomology. About ten years ago the complete destruction of the orange groves of California was threatened by the spread of an insect known as the cottony-cushion scale. The vitality was being sucked out of the trees by millions of tiny insects that literally covered them. The pests got completely beyond the control of the fruit-growers of that country and in their despair they appealed for help to somebody or anybody. Professor Riley, who was in charge of the Entomological Department at Washington, and who unfortunately met his death in 1895,—one of the greatest benefactors the American people has ever known—at once began the investigation of that question. Being an expert entomologist he knew practically every country in the world where that scale insect was common and he knew that the place from which it had most likely come was Australia. It had probably been introduced some twenty years before that, in bringing in fruit trees or vines. He however knew it had never become a pest in Australia. Now if it is found in Australia and later found in California and had become a pest in California and had not become a pest in Australia, he concluded that there must be something in Australia that will stop it, so he despatched two assistants to Australia to investigate it and they sent back consignments of lady-bug beetles or lady-bugs as they are commonly known. You have seen these running back and forth over the leaves and branches of the fruit trees doing great destruction to the other insects. Within a very short time, less than a year, although these scale insects had been increasing for twenty years and practically had the product of California by the throat, and in fact had taken possession of the country; in less than a year, this little lady-bug had increased to such numbers that it swept the scales out of existence or got it into such control, that the fruit interests of California were saved. I do not suppose that anybody could sit down and readily figure up the amount of money that was saved or made for the United States by that simple little insect brought in by a man known to very few present. You do not see his name prominent in the newspapers. The fact was not heralded broadcast in great flaming type. He was not given any great ovation. It is a question whether any monument will be erected to

him by the United States, yet it is doubtful whether the United States has had any greater benefactor than that man and his associates. The importance of Economic Entomology to the farmer is thus referred to by the late Prof. Panton of our Agricultural College, in an article contributed to the Farmers' Institute report for 1896-7: "The study of insects in relation to man has of late years commanded much attention, and is usually referred to as Economic Entomology. While there are some insects beneficial to man, there are many injurious. Some destroy his food, some injure his clothing, and others attack the animals that are of use to him. Nearly 100 species have been found preying upon his grain and forage crops; upwards of 40 upon his vegetables: 50 upon the grape; 75 upon the apple. The pine has 125 species as enemies; the oak 300; the elm 80; the hickory 170; the maple 75; the beech 150; while the unfortunate willow battles against 400 insect foes. The following statistics show what an immense loss is sustained by man from insects:

1854—The United States lost \$15,000,000 by the wheat midge.

1857—Canada lost \$8,000,000 by the wheat midge.

1864—The United States lost \$73,000,000 by the chinch-bag.

1870—New York State lost \$5,000,000 by the cabbage worm.

1873—The Southern States lost \$25,000,000 by the cotton worm.

1874—The United States lost \$356,000,000 by the grasshopper.

1884—Canada lost \$500,000 by the clover midge.

The average loss of the United States from insects during 1884 is calculated to have been \$400,000,000, and for 1891, \$300,000,000. With such figures before us, in most cases under the mark, we must conclude that the study of a subject that will enable us to lessen this loss is of great importance."

The biologist is studying the microscopic forms of life that produce plant food in the soil, that bring about the changes in stored foods, that control the fermentations in milk, butter and cheese, and that cause the many diseases in our live stock. The debt that the whole world owes to the great Pasteur should not be forgotten. He established the principles of wine making and saved the vineyards of France; he laid the foundations for dairy bacteriology; he mastered anthrax, the terrible disease that threatened the annihilation of the herds, not of France alone, but of all Europe as well. He was one of the greatest geniuses that the world has ever known, and agricultural science received a wonderful impetus from the labor of his head and hands and heart.

So important is scientific research in connection with agriculture that one noble minded Englishman set apart a great estate in England for that work, and endowed it with £100,000. For about half a century the work has been carried on at Rothamsted, and the Queen has recognized it by knighting its donor and his assistants. Sir John Bennett Lawes and Sir Joseph Gilbert are familiar names in the higher agriculture of the whole world.

One of the hopeful signs of the times is that agricultural scientific investigation is attracting more and more attention on the part of our governments, young men of promise are being drawn into its ranks, splendid opportunities for research are being provided in many countries, and we may confidently look forward to a great advancement in the next quarter of a century. The probable effect upon agricultural life of the application of scientific investigations and discoveries may well attract your careful attention.

Changes in Methods of Work and the Introduction of Co-operative Associations.

Let me finally refer in a few words to the changes that have taken place or are now taking place in the life and methods of the farming community. It is but a few years since the farmer lived in a log house built by his own hands and but rudely furnished. The heating and cook-

ing were done at the big open fire place. The food of his table was entirely of his own raising and was therefore limited in its variety. For many years his clothes were of deerskin or of homespun, his winter's cap was of the same material, his summerhat was of straw plaited by his own family. His logging and hauling were done by oxen¹⁵. He cut the grain with sickle, scythe or cradle, and his wife and children followed with rakes binding and shocking the grain. He threshed on the barn floor with the cumbersome flail or by the tramping of his horse's feet, and he winnowed after the manner of bye gone centuries. He flung a bag of wheat over the back of his only horse, or he placed it in his canoe or perchance he swung it over his own sturdy shoulder and strode off by the trail to the little mill miles away where by water power it was ground into flour between stones. The social life of the community was largely maintained in the old fashioned "bees" when the neighbors gathered for a logging or clearing, a barn-raising, a road-making, a corn shocking or even a pig killing. The women had their bees for carpet making or quilting. Traces of these old customs are still to be seen in the well worn rag carpet of some old farm house or the log cabin quilt that still appears at country fairs. Many of our grandfathers and grandmothers made love to one another at an apple paring bee when the young men pared the fruit and the young women quartered, cored and strung them on strings to hang up on the cross beams to dry for winter's use. The school teacher, generally a full grown man who had seen service in the old land, "boarded round" and was eagerly looked for in many homes. The cobbler or shoemaker went from house to house with his tools and roll of leather staying at the house till the whole family were rebooted or reshod. The peripatetic tailor dropped in from time to time to make up a suit or two for Sunday wear. The clockmaker came on his rounds and cleaned up the old clock, the grandfather's clock, that stood in the corner of the living room and started it aright though the older members of the family never forgot to make their reckoning by the sun. From time to time the dusty pedlar turned in and laid down his capacious pack, and became for the time being the most important personage in the world to the younger members of the family¹⁶.

Most of these old customs have been changed and a new system now is followed. The old log house has become a blacksmith shop or an outhouse or has been pulled down, and the frame or brick or stone dwelling has taken its place. Its furnishings have been bought in town. In many cases it is warmed with coal. The grocer and the merchant are regularly visited by the farmer or his wife and cash purchases have largely taken the place of barter. Through many districts the baker's and the butcher's carts make their rounds two or three times a week. The only universal remnant of the old "bee" that still lingers is the "raising bee" when the timbers of the great farm barn are set up and many hands are needed to lighten the work. Threshing bees are also still in vogue in some sections.

To a large extent the farmer does his own work and limits his operations to his own farm and his own help. We still find however the thresher with his three or four helpers going from farm to farm with his machine and portable steam engine. Sometimes in a newly settled section the owner of a mower or binder will engage to cut for his neighbors in rotation. An interesting event in farming operations is the annual harvest excursion to the wheat lands of Manitoba. The farmers of Manitoba are unable of themselves to harvest their extensive crops in the short time between ripening and frost. Every year from 3,000 to 5,000 extra "hands" go from Ontario to Manitoba by special trains to take part in this work. Some return in the fall, some find permanent employment, and some remain to take up claims for themselves. Other cases of the migration of farm help are to be found in connection with fruit growing, hoppicking and flax growing. For instance when the fruit crops of the Niagara district are about ripe large numbers of Indians from the Grand River reserves move into the district, pitch their camp and hire out to pick strawberries, raspberries, grapes etc. When hops are ready to pick in Waterloo county

or around the Bay of Quinte and when flax is ready to pull in Perth county and the adjacent townships numbers of women and children from the towns go out to engage in the work. Migration for temporary work is to be found also in the vicinity of canning factories; on the whole however the farmer in his method of work is approximating more and more the mode of work known to dwellers in our towns and cities.

I have referred to the co-operation in work among the early settlers. We are coming into another form of co-operation. I have spoken of the success of co-operative methods in connection with the making of butter and cheese. One other form of co-operation must be mentioned and that is in the great increase in all kinds of associations for improvement. An agricultural society was organized at Niagara or Newark in 1792 or 1793. Of its existence and of its usefulness but little is known at the present day. It was not till 1830 that practical encouragement was given these societies on the part of the Legislature. They have continued ever since. In 1867 apart from these general societies for holding fairs, there was only one other association, that of the fruit-growers. In 1897, however, there were Farmer's Institutes organized in every riding or district of Ontario, there were twelve live stock associations, two dairy associations, a Bee-keepers Association and the Entomological Society.

The report of the Ontario Commissioner of Agriculture for 1868, filled only 272 pages, and its distribution was confined to a few copies. In 1897, the agricultural reports of the department were eleven in number and made 1,808 pages over 200,000 of these reports were distributed, in addition to large numbers of bulletins.

In the three years 1868-69-70 the Legislature spent \$195,969 in behalf of agriculture of which \$161,392 was for agricultural societies, \$30,000 for the provincial fair, and \$1,050 for the Fruit-growers Association. In the three years 1895-96-97, the Legislature spent \$718,156 for all agricultural purposes including the agricultural societies, the various associations, the Agricultural College, the dairy schools, Farmer's Institutes, Fruit Experiment Stations, Good Roads Branch, Printing of Reports, and collection of Agricultural Statistics¹⁷. The total expenditure by the Legislature on behalf of Agriculture for the thirty years 1868-97 inclusive has been \$4,509,090.

The most noticeable characteristic of Agriculture in this province to-day is the intellectual progress manifest in so many ways. It is a hopeful sign of the times that farmers are asking for meetings and for specialists to address them—more requests than can be complied with; and that they are asking for reports and bulletins in greater number than our appropriations permit us to publish. The farming class have begun to read, to think, to discuss, and to enquire.

The seed that is now being sown cannot but yield a harvest that will some day astonish the people who are not directly engaged in Agriculture or carefully following the development. There is springing up in your midst a *new agriculture*. As students of political economy I urge you to watch its growth, to get into sympathy with its progress, and by your researches and your study, to assist our country to have a right appreciation of its importance.

C. C. JAMES.

NOTES.

SUPPLEMENTARY TO THE PAPER ON "THE DEVELOPMENT OF AGRICULTURE IN ONTARIO."

In order not to burden the paper with statistics and quotations and thereby, to a large extent, interfere with the continuity of the discussion, it was thought best to reserve the notes here appended. As many requests have been made from time to time for the information contained in these notes, it has been deemed advisable to place them here and to make the reference to their places in the address by numbers.

1. *Primary sources of wealth.*

Sometimes in discussions of this nature "manufactures" is added as a fifth source of wealth. It will, I think, be admitted that the manufacturer takes the products of the fisherman, the miner, the lumberman or forester, and the farmer and turns them over or manufactures them into something a little more valuable. In a sense the fisherman, the miner, the lumberman, and the farmer are manufacturers. The importance of manufactures relative to the other four classes cannot be given by stating the value of the manufactures. These are the reasons for not including manufactures as a fifth class—it is not one of the primary sources of wealth. The value of manufactures according to the census of 1891 was \$465,000,000. For number of persons engaged see note No. 5.

2. *The Fisheries of Canada.*

The following facts are taken from the report of marine and fisheries for 1897 :

The fisheries of Canada are the most extensive in the world. The value of the sea and inland fisheries in 1857 was estimated at under one million dollars, and in 1859 they were valued at about a million and a half dollars, but in 1867 they had reached \$4,000,000 ; in 1877, \$12,000,000 ; in 1887, \$18,386,000 ; and in 1896, \$20,400,000. The product for 1896 was made up as follows :

	Value in 1896.	Value in 1886.
Nova Scotia	\$6,070,895	\$8,415,362
New Brunswick	4,799,433	4,180,227
British Columbia	4,183,999	1,577,348
Quebec	2,025,754	1,741,382
Ontario	1,605,674	1,435,998
Prince Edward Island	976,126	1,141,991
Manitoba and N.W. Territories	745,543	186,980
	\$20,407,424	\$18,679,288

Between the years 1869 and 1896 inclusive the five principal commercial fisheries yielded as follows :—Cod, \$106,433,217 ; herring, \$54,373,042 ; lobsters, \$48,964,860 ; salmon, \$45,740,470 ; mackerel, \$37,589,835—total \$293,101,424.

The total value of all the fisheries of Canada for the twenty-eight years 1869 to 1896 inclusive, was \$420,168,045, of which amount Ontario contributed \$28,157,013.

The value of the fishing boats, tugs, nets, and other fishing material used in Ontario in 1896, was \$838,532.

3. Products of the Mines of Canada.

	Quantity.	Value.
Coal	tons. 8,876,201	\$7,286,257
Gold	6,190,000
Silver	oz. 5,558,446	3,322,905
Copper	lbs. 13,300,802	1,501,660
Nickel	lbs. 3,997,647	1,399,176
Lead	lbs. 39,018,219	1,394,853
Petroleum	bbls. 709,857	1,011,546
All non-metallic products		\$14,542,939
All metallic products		13,996,234
Estimated value of products not returned		250,000
Total for all Canada, 1897		\$28,789,173

The total values for previous years were :

1896	\$22,609,825	1890	\$16,763,353
1895	20,715,319	1889	14,013,913
1894	19,933,837	1888	12,479,550
1893	20,035,082	1887	11,365,705
1892	16,628,417	1886	10,221,255
1891	18,976,616		

(Compiled by E. D. Ingall, M. E., of Geological Survey of Canada.)

Mineral Products of Ontario.

The following statement of the mineral products of Ontario for 1897 is taken from the latest report of the Ontario Bureau of Mines issued in 1893. (A. Blue, Director of Ontario Bureau of Mines):

Ontario Mineral Product, 1897.	Quantity.	Value.
Central, natural rock	barrels. 84,670	\$76,123
Cement, Portland	" 96,825	170,302
Pressed brick, plain	number. 7,148,908	53,727
Pressed brick, fancy	" 895,000	9,350
Roofing tile	" 35,000	400
Terra cotta	"	35,800
Paving brick	4,567,380	45,670
Sewer pipe	"	73,551
Petroleum	imperial gallons. 25,556,691
Illuminating oil	" 10,891,337	1,131,083
Lubricating oil	" 1,959,810	199,755
Benzine and naphtha	" 949,341	77,340
Gas and fuel oils and tar	8,021,633	281,035
Paraffin wax and candles	lb. 2,139,278	88,378
Natural gas	"	308,448
Calcium carbide	tons.* 574	34,440
Salt	" 54,686	249,880
Gypsum and products of	" 1,729	17,950
Graphite and products of	" 400	8,500
Iron	" 24,011	288,127
Nickel	" 1,999	359,651
Copper	" 2,750	200,067
Gold	oz. 11,412	190,244
Totals	{ 1897	\$3,899,821
	{ 1896	3,794,003

* Net tons of 2,000 lbs.

4. *Forest Products of Canada.*

The forest products of the Dominion as given in the census of 1891, applying to them the values given in the customs returns of exports, amounted to \$80,071,415. Mr. George Johnson, Dominion statistician, in his Report on the Forest Wealth of Canada, Ottawa, 1895, p. 161, gives the forest products of the four provinces, Ontario, Quebec, Nova Scotia and New Brunswick, as follows :

	1891.	1881.	1871.
White pine	\$2,420,298	\$3,558,422	\$3,635,535
Red pine	209,038	421,710	287,702
Oak	782,061	1,911,789	775,972
Tamarac	482,300	550,274	404,412
Birch and maple	376,941	574,270	257,247
Elm	762,285	749,561	344,538
All other square timber	6,674,590	11,753,700	5,576,200
Logs—pine	11,581,506	17,845,936	8,877,774
Logs—all other	19,098,729	11,527,853	3,725,823
Spars and masts	256,686	171,971	227,640
Staves	418,724	290,253	321,650
Lathwood	1,456,735	455,825	128,285
Tanbark	1,475,176	1,792,576	731,346
Firewood	21,269,189	21,825,762	19,168,783
Total	\$67,264,258	\$73,429,922	\$44,462,907

5. *Occupations of the People of Canada in 1891.*

Class.	Number.
1. Agriculture, mining and fishing	790,210
2. Trade and transportation	146,695
3. Manufacturing and mechanical pursuits	320,001
4. Domestic and personal services	246,183
5. Professional vocations	63,280
6. Non-productive class	52,986
Total	1,659,355

Class 1 was subdivided as follows :

(a) Agricultural	735,207
(b) Fishing	27,079
(c) Lumbering	12,756
(d) Mining	15,168
Total	790,210

The agricultural class was further subdivided :

Farmers, and farmers' sons	649,506
Farm laborers	76,839
Apiarists, gardeners, florists, etc	6,120
Dairymen, stock-raisers, stock-herders, etc.	2,742
Total	735,207

	No of farmers and farmer's sons.		No. of miners.		No. of fishermen.	
	1881.	1891.	1881.	1891.	1881.	1891.
British Columbia	2,381	5,874	2,792	4,591	1,850	3,799
Manitoba	18,497	29,014	6	9	44	78
New Brunswick	54,485	45,890	121	97	1,844	2,928
New Scotia	63,435	53,340	2,728	5,660	13,631	14,478
Ontario	300,554	292,770	493	1,034	766	1,421
Prince Edward Island	20,492	20,227	4	18	791	914
Quebec, ...	200,857	191,564	391	1,534	3,935	3,433
N. W. Territories	1,011	10,837	6	474	44	33
Totals.....	656,712	519,506	6,541	13,417	22,905	27,079

6. Early Trade Records of Canada.

A detailed reliable record of the exports of Canada would be very interesting in this discussion if such were available. Unfortunately this record can be got only in fragmentary form. The exports of Upper Canada went out by two routes, across the border into the neighboring States and down the St. Lawrence past Coteau to Montreal and Quebec, whence they were shipped to Europe. Mr. George Johnson informs me that "the returns for the Port of Quebec were collected from the first by Mr. Dunscombe, and the British Government also had a full set. The British Government's set was destroyed by fire about 1815. Subsequently Dunscombe's collection was also destroyed by fire."

In Vol. V. of Commercial Statistics, by John Macgregor, M.P. (1850), former secretary of the British Board of Trade, we find, on pages, 254, 255, a condensed statement of the trade of Canada for the years 1754, 1769, 1786 and 1808. Furs, fish and lumber are referred to in the first three years. In 1808 the exports of pot and pearl ashes from Quebec amounted to £290,000 out of a total export of £1,156,060. In the same year the imports of ashes into Canada from the United States amounted to £110,000.

On page 266 of the same work we have the following among the exports by sea from Canada :

	1835.	1840.	1844.
Ashes, cwts.....	120,226	99,899	156,748
Wheat, bushels.....	61,727	160,862	308,654
Other grain, bushels.....	11,837	68,928	245,763
Wheat flour, bbls.....	91,063	330,010	389,102

These figures, however, do not quite harmonize with another table of exports given on p. 269. On page 270 is given a table of values of the most important articles exported from Canada which may be reproduced here for what it is worth as showing the change in the products during the eleven years, 1832-42 :

	Ashes.	Grain, etc.	Timber.	Total.
	£	£	£	£
1832	204,667	221,552	471,837	898,056
1833	174,281	241,720	489,367	905,368
1834	108,287	139,742	683,208	931,237
1835	176,231	39,500	620,192	836,003
1836	238,951	28,804	703,165	970,920
1837	180,571	15,331	651,786	847,688
1838	168,980	46,034	706,185	921,199
1839	142,457	32,052	80,403	1,054,912
1840	126,148	494,507	952,826	1,573,481
1841	121,733	660,908	1,019,745	1,802,386
1842	157,906	512,324	522,203	1,192,433

ying to them the
5. Mr. George
la, Ottawa, 1895,
Scotia and New

1871.
635,535
287,702
775,972
404,412
257,247
344,538
576,200
877,774
725,823
227,640
321,650
128,285
731,346
168,783
462,907

umber.
790,210
146,695
320,001
246,183
63,280
52,986

59,355

35,207
27,079
12,756
15,168

90,210

49,506
76,839
6,120
2,742
35,207

Mr. George Johnson, in the communication before quoted, says:—The Colony was accustomed to transmit to the Home Government every year a manuscript report of the taxes, duties, fees, etc., etc., which gave an immense deal of information about the country. I have the manuscript copy for the year 1842 which I rescued from destruction not long ago. I have little doubt that these would be available in some nook or corner of some one or other of the places in which the British Government is obliged to store them. Their value is "another story."

Take the report for 1842 which I have before me and under the head of *Exports* we have, 1st, a return for the Port of Montreal; 2nd, a return for the Port of Quebec; 3rd, a short statement of the exports to the United States from Inland Ports. So that down to the year 1842 there was no division by Provinces. I give you an extract, which refers to the *Inland Ports*:

"The exports to the United States (for 1842) consist principally of apples, ashes, lumber, furs and casual articles of merchandise, but the value is very limited. The staple exports by sea are wheat, flour, lumber, pot and pearl ashes, staves, beef, pork and furs. Tobacco is produced and exported in the western district of Upper Canada. The value at these ports cannot be ascertained, as the customs house officers in general keep no account of them, being duty free."

"The ports of St. Johns and Phillipsburgh are the principal ones in Lower Canada, the value of exports at the former is returned at £100,214.15.10, including £82,783.11.6 in specie, and at the latter, £11,924.1.6. From the other Lower Canada and the Upper Canada ports no return of any kind can be procured."

Up to the time of the opening of the Erie canal the exports of Upper Canada for Europe went east by way of the St. Lawrence. The following statement of the trade passing Coteau was furnished by Mr. Robert Sellar of Huntington, Que. The batteau was a long sharp pointed boat and the Durham boat was flat bottomed, made like boats used on the Mohawk river, N. Y.

Year.	Batteaux.		Durham boats.		Year.	Batteaux.		Durham boats.	
	No.	No.	No.	No.		No.	No.	No.	No.
1817.....	835	268	1826.....	167	313				
1818.....	679	315	1827.....	254	497				
1819.....	573	339	1828.....	403	358				
1820.....	430	561	1829.....	No record.					
1821.....	357	442	1830.....	712	530				
1822.....	385	407	1831.....	837	371				
1823.....	377	317	1832.....	817	451				
1824.....	457	292	1833.....	864	612				
1825.....	No record.								

In an early Legislative report on the canals of Upper Canada it is stated that going down the Durham boat carried on the average 350 barrels and the batteau thirty barrels; on the way up the former eight tons and the latter four tons.

7. Prices of Wheat.

The following average prices of wheat per minot for the years given are taken from a statement furnished some years ago by Mr. Robt. Sellar of Huntingon, Que. They were compiled by Rev. M. Comte and refer to Montreal. The minot is a measure of quantity, forty quarts. The livre may be taken at seventeen cents and the sol at three-quarters of a cent.

Year.	Livres.	So's.	Year.	Livres.	Sols.
1800.....	12	..	1814.....	9	..
1801.....	6	..	1815.....	16	..
1802.....	6	..	1816.....	12	..
1803.....	6	..	1817.....	7	10
1804.....	9	..	1818.....	8	5
1805.....	8	..	1819.....	6	..
1806.....	8	10	1820.....	4	10
1807.....	9	..	1821.....	5	5
1808.....	9	10	1822.....	6	..
1809.....	10	10	1823.....	6	12
1810.....	10	10	1824.....	6	..
1811.....	12	..	1836.....	10	..
1812.....	19	..	1837.....	8	10
1813.....	16	..	1841.....	7	10

8. The Growth of Population and Increase in Farm Operations in Ontario.

In 1784 there were in Upper Canada "about 10,000 United Empire Loyalists" according to memorandum contained in the appendices of the House of Assembly of U. C. for 1823. According to Bouchette (the British Dominions, vol. II., p. 235) the population was as follows: In 1806, 70,718; in 1811, 77,000; and in 1814, 95,000. The municipal census returns give the population as 150,066 in 1824 and 157,923 in 1825. The following statement for the years 1826-1841 is made up from the returns sent to the Legislature.

Year.	Popu- lation. No.	Area.		Horses. No.	Oxen, & years and upwards. No.	Milch cows. No.	Other cattle, 2 to 4 years old.
		Occupied. Acres.	Cultivated. Acres.				
1826.....	166,379	3,353,653	599,744	23,806	26,302	62,198	25,669
1827.....	177,174	3,579,554	645,792	25,228	29,091	66,878	27,661
1828.....	186,488	3,632,540	668,326	25,701	29,814	67,188	37,304
1829.....	197,815	3,726,330	717,553	28,388	33,332	75,071	34,765
1830.....	213,156	4,018,385	773,727	30,776	33,517	80,892	32,537
1831.....	236,702	4,387,777	818,416	33,428	36,131	84,373	35,162
1832.....	263,554	4,716,372	916,357	36,822	39,054	92,274	35,172
1833.....	295,863	5,154,211	938,956	40,254	41,870	95,042	35,760
1834.....	321,145	5,127,064	1,004,779	43,217	42,455	99,823	36,795
1835.....	347,359	5,703,219	1,309,785	48,118	46,080	110,051	39,371
1836.....	374,099	6,089,694	1,283,709	55,064	48,938	121,024	44,706
1837.....	397,489	6,280,611	1,440,505	57,250	48,453	120,110	49,110
1838.....	399,422	6,769,050	1,469,737	63,396	47,703	129,711	50,649
1839.....	409,048	6,670,083	1,556,677	66,220	47,491	136,171	47,607
1840.....	432,159	7,011,706	1,713,163	72,696	48,990	148,483	49,565
1841.....	455,688	6,868,504	1,811,431	75,316	49,940	157,411	56,756

The following table is made up from the census reports. Note increase in live stock.

	1842.	1848.	1851.	1861.	1871.	1881.	1891.
Population.....	487,063	725,879	952,004	1,396,091	1,620,851	1,926,922	2,112,989
Land occupied, acres.....	6,212,726	8,413,591	9,828,655	13,354,896	16,162,676	19,259,909	21,091,698
Land improved, acres.....	1,761,528	1,780,157	3,705,523	6,051,609	8,833,626	11,294,109	14,157,962
Horses, No.....	113,647	151,389	201,670	377,681	489,001	530,298	771,898
Neat cattle.....	504,963	565,845	744,264	1,015,278	1,403,174	1,702,167	2,062,474
Sheep.....	575,730	833,807	967,168	1,170,225	1,514,914	1,369,178	1,021,769
Swine.....	394,366	484,241	571,496	776,001	874,654	700,922	1,121,396
Wheat, bush.....	3,221,989	7,558,773	12,682,550	24,620,425	14,233,389	27,406,091	21,318,582
Oats, bush.....	4,786,377	7,055,730	11,395,467	21,220,874	22,188,958	40,209,929	47,160,246
Potatoes, bush.....	8,080,402	4,761,316	4,973,285	15,325,920	17,138,534	18,893,996	17,635,151

9. *Immigrants into Canada.*

The arrivals at Quebec in 1829 were 15,945, and in 1830, 18,075. From 1829 to 1846 inclusive the number of immigrants who arrived in Canada at Quebec was 466,179. The arrivals for the years following were:

1847.....	90,150	1851.....	41,176
1848.....	27,939	1852.....	39,076
1849.....	38,494	1853.....	36,699
1850.....	32,292	1854.....	53,183
Total for eight years		359,009	

Of the 90,150 arrived in 1847 no less than 50,360 came from Ireland.

The population of Upper Canada in 1851 as to origin was as follows:

Canadian born, not French	526,093	Scotland.....	75,811
" " French ..	26,417	United States.....	43,732
Ireland	176,267	Other provinces.....	6,498
England and Wales	82,699	All others.....	14,487
Total	952,004		

10. *Importation of Pure Bred Cattle into Ontario.*

About 1831, Mr. Robert Arnold of St. Catharines, brought a shorthorn cow and a bull to Canada from the State of New York. The dam of the cow was bred by Robert Colling. Mr. Wingfield's imported cattle also included some Colling stock. They were afterwards sold to Mr. Howitt of Guelph. About 1836, Hon. Adam Fergusson of Woodhill imported several head of pure-bred stock from over the sea and from the neighboring states. Further importations are mentioned in the preface to Vol. I of the Canada shorthorn Herd Book compiled and published by the Board of Agriculture of Upper Canada, Toronto, 1867. The year by year importations of shorthorns are to be found in the introductions to the various volumes of the Dominion shorthorn Herd Book beginning in 1886.

"Dairy cattle were first brought to Canada by the colonies of settlers who accompanied explorers to occupy this country; each party brought what they considered the most suitable of the kind from their respective former homes.

"During the year 1610 a French settlement was formed at Quebec by Viceroy Champlain. From 1630 to 1650 Reverend Gentlemen and others imported dairy cattle that are known as the native Canadian cow, of which very few (if any) can now be found pure-bred. Their excellent quality and suitability to this country should have induced their owners to preserve the purity of that breed.

"About the year 1625 dairy cattle from Great Britain were brought to the lower St. Lawrence by settlers who came to occupy the grant of territory made by King James the 1st to Sir Win. Alexander, under the great seal of Scotland; thenceforward settlers coming to Canada brought with them dairy cattle best suited to these settlements.

"The importation of pure-bred Ayrshires is clearly traced to the arrival of Scotch ships bringing them for the use of passengers on the voyage. They were sold on arrival at the Eastern harbors, at Quebec and at Montreal.

"Lord Dalhousie, Governor-General in 1821, was a breeder and importer of Ayrshires. Other governors, shipmasters, merchants and farmers not now living were owners of Ayrshires thus obtained. The good appearance and performance of these animals attracted such attention that it became a general practice, over fifty years ago, to induce shipmasters to bring out a couple or more Ayrshires, till the importation for breeding purposes became very frequent during the early part of the present century, and it has since been regularly continued.

"It is estimated that there are now in Canada over fifty thousand pure-bred Ayrshire cattle, and not less than three hundred thousand Ayrshire grades, which are the best herds of dairy cows in the Dominion."

The foregoing paragraphs are from the introduction to the first volume of the Canada Ayrshire Herd Record Montreal, 1886. The records in this book include animals born in Canada as early as 1862. Ayrshires are found principally in Eastern Ontario, the Montreal District and the Eastern Townships.

11. *Sample Statements of Cooperative Dairy Companies.*

(a) Cheese and butter factory in Oxford County, (The Strathalbyn Cheese Co.) In 1897 there were 140 patrons; 530,624 lb of cheese were made; value of cheese, \$44,501; distributed among patrons \$39,367. From 1879 to 1897 this company has made 6,640,225 lb of cheese which sold for \$626,906.

(b) Statement of a factory in Western Ontario. One hundred and forty-one shareholders; \$1,030 subscribed, being 206 shares at \$5 or less, \$895 paid on stock; cost of factory \$1,329. In 1897 milk received was 1,815,740 lb; cheese made was 165,223 lb. The cost of drawing was \$1,813; the cost of making \$1,075; salesman's expenses \$30; secretary's salary \$35; new machinery, well and repairs, insurance taxes, etc., \$1,263. Sales of cheese \$12,586. Paid patrons for milk \$8,370.

(c) Co-operative factory in Lanark County. Sixty-eight patrons, factory run from May 3 to Nov. 5, 1897—161 working days; 1,358,276 lb milk received; made 1,740 cheese, weighing 130,737 lb. Cheese sold for \$10,780; interest on deposit, \$24—total receipts \$10,804. The cost of drawing milk and making cheese (1½c per lb.) was \$2,124. The salesman and treasurer was paid \$70. The inspector received \$5, other expenses were \$11. The remainder, \$8,573, was divided among the patrons.

(d) Statement of a Cheese and Butter Company of Western Ontario. Sixty-six stockholders, 95 patrons, subscribed capital \$1,530, (306 shares at \$5 each) paid up \$1,015. In 1897 milk received was 1,423,851 lb; cheese made was 131,463 lb, of which the patrons themselves took 5,380 lb. The cost of drawing milk and hauling cheese was \$1,226; the cost of making was \$992; other expenses were \$290. The cash received for sale of cheese was \$10,348; the cash paid to patrons was \$7,583.

12. *The Reaping Machine.*

"Until about fifty years ago the most important agricultural operations were conducted upon the same principles as had ruled for ages before that time. The form of the plough was certainly improved, and was no longer the rude implement which Robert Burns used a hundred years before; but it was still operated in the same fashion as prevailed in his day. Even now the sower goes forth to sow just as he did in New Testament times; and husbandry until a recent period was much the same as it had been when Thomas Tusser wrote his "Five Hundred Points of Good Husbandry" in 1573. The conservatism which surrounded practical agriculture is now being gradually dissipated, but the battle between the old forms and the new has been more protracted here than in any other occupation. Look, for instance, at the operation of reaping. Circumstances continually occur year after year which make it imperative that the fields should be reaped expeditiously, and the harvest garnered as rapidly as possible. Yet no feasible method of applying machinery to this work was proposed until the nineteenth century had begun, and even after a practicable reaping machine had been invented it took many years to induce the farmers to adopt it generally. So late as 1870 the work of reaping was done by the sickle or the scythe, and manual labor was the only motive power used. The crops were reaped by "heuk-men," the sheaves were made up by women, and gleaners went over the fields precisely as they did when Boaz met Ruth "amid the alien corn." And yet the idea of the modern reaping machine was realized and in full operation in the first century, and that among a nation which was then regarded as only half civilized. The description which Pliny gives of this machine might have been applied to some of the reaping machines invented early in the present century. He says: "In the extensive plains of Gaul large hollow machines are employed, with teeth fixed to the forepart, and they are pushed forward on two wheels, through the standing corn, by an ox yoked to the hind part; the corn cut off by the teeth falls into the hollow part of the machine." It is difficult to account for the disappearance of this useful machine, nor is it easy to discover when its use was abandoned. Rutilius Palladius, the Roman writer on agriculture, who lived in the fourth century, refers to this machine in his work "De Re Rustica"; but even at that time its use seems to have been confined to Gaul. Though Palladius's book was regarded as the chief authority on agriculture, and was the text-book of the mediæval farmers, no attempt was made to revive the ox-driven reaping machine, and it was forgotten for over 1400 years. The principle upon which it was constructed—cutting teeth instead of scythe blades—was the main peculiarity of the machine invented by the Rev. Patrick Bell, of Carmyllie, in 1826. Before referring to that machine specially it may be desirable to show briefly the progress of development whereby reaping by machinery was brought to its present state of perfection. It seems probable that various attempts were made towards the close of last century to devise a reaping machine which would minimise the cost of harvesting, but no particulars of these have been preserved. In 1804 Mr. Boyce obtained a patent for a reaping machine. It consisted of a cylinder set vertically upon a carriage that ran upon small

wheels, the cylinder enclosing this carriage. The trams that extended to the back of the machine were so contrived that a horse could be yoked, and the apparatus was pushed forward by the animal. By a simple arrangement of bevel gearing the motion of the machine caused the cylinder to revolve. Around the lower edge of this drum or cylinder a flange projected, which consisted of a series of knife blades set to form a continuous circle, and as the machine was propelled this circular knife cut the corn, which fell to each side of the apparatus. The drum could be raised or lowered so as to make long or short stubble as desired. There was no arrangement for gathering or bundling the cut corn, and this defect prevented the machine from being used practically. About the same time a patent was obtained by Mr. Plunkett, of London, for another reaper, the chief difference being that the knife blade was toothed like a fine saw. It also failed through the lack of a method of gathering the corn when cut. In 1806 Mr. Gladstone, a millwright, of Castle-Douglas, devised a reaper, upon which he made many improvements in later years. The horse shafts projected at the side, so that the horse walked on the stubble. A circular frame carrying a knife was made to revolve by the forward motion of the machine. Projecting prongs kept the corn in place against the revolving cutter, and an elaborate device was used for gathering up the cut corn in small quantities. Drawings and full descriptions of the earliest and latest forms of the Gladstone reaper are to be found in Brewster's "Edinburgh Encyclopedia," Vols. 1 and 17. Though hailed at first as a great achievement, this reaper never came into general use. Mr. Salmon, of Woburn, brought out in 1810 another machine in which for the first time he revived the very ancient process of clipping the corn with shears, but it also fell into oblivion.

"In 1816 Mr. Scott, of Ormiston, devised a reaper on quite a different principle. It was similar in form to the Gladstone machine, but instead of a circular knife blade there was a frame fitted with sixteen small sickles, which cut the corn that was held in position by the projecting prongs. The great difficulty in working this machine was to keep the sickles free of the corn, for portions of the straw getting into the revolving apparatus brought it to a standstill. About the same time Mr. Smith, of Deanston, proposed to construct a reaper in which he reverted to the revolving knife blade, but though he worked at improvements upon it for over twenty years, his plan failed. The first forward movement took place in 1822, when Messrs. Ogle & Brown, Alnwick, brought out their machine for reaping and gathering. In it the cutting was done by a straight knife which was moved from side to side by the motion of the machine, and cut the corn against a row of fixed teeth or prongs. A revolving vane took up the cut corn and deposited it on a deal platform behind the cutter. Like its predecessors, this machine was not taken up by the agriculturists. These inventions had prepared the way for the reaping machine devised by the Rev. Patrick Bell. He was born in 1800, and though trained for the Church he early developed a bias towards the study of mechanics, and was a good practical workman. About 1820 he set himself to the problem of constructing an effective reaper, making his own models with such scraps of iron as he could obtain cheaply. His machine was in working order by 1826, and at that time his brother had one in operation on his farm of Inch-Michael, in the Carse of Gowrie. The clipping process was adopted by Mr. Bell. Instead of a single knife blade vibrating from side to side, as in Ogle & Brown's machine, he had a moving frame with a series of projecting knives like scissor blades, which worked above a similar set of fixed knives. The cut corn fell on an endless web of cloth which ran round two rollers, and delivered the corn on one side of the machine. The reaper was pushed forward by a horse, and the motion set all parts of the machine working simultaneously. There was no complicated machinery required, and it was proved that one machine could reap twelve acres per day."—*Dundee Advertiser*.

The New York Farmer and American Gardener's Magazine for 1834 p. 111 contains a description (by the inventor) and illustration of Obed Hussey's grain cutter, and the appendix to the same volume p. 73 contains a description (by the inventor) and illustration of Cyrus H. McCormick's "Improved reaping machine." These two machines are the fore-runners of the reapers and binders now used in the United States and Canada.

13 Early Highways.

The 1896 report of the Ontario Provincial Instructor in Roadmaking, Mr. A. W. Campbell C. E., contains a chapter in Development of Roads in Ontario. Speaking of "trails" and early routes he says:

"The most important of these routes, frequently referred to by early writers, led from Burlington bay to the head waters of the Thames, down which the traveller might descend by canoe to Lake St. Clair. A branch of this trail, mentioned by Galinée, led from the ford at the Grand river to Longue Point. An early map shows an Indian path following the north shore of Lake Erie. Trails led from Lake Erie to Chatham and London. From the northern branch of the Thames, a short portage and canoe route led to Lake Huron. A trail led from the Don

to Burlington bay. Nottawasaga Bay was reached from Lake Ontario by the Trent valley; by the Don or Humber and portages of Lake Simcoe, from which several routes might be taken. One of these last led from Kempenfeldt bay to Nottawasaga river; another passed by way of the River Severn.

The first explorers, traders and settlers who entered this portion of Canada, in the absence of roads, had to adopt the methods and means of travel used by the aborigines. Champlain, who in 1615 made the first tour of discovery, went by canoe up the Rivers Ottawa and Madawaska, across Lake Nipissing, and thence by the French river to Georgian bay, a journey which necessitated about forty portages. This was the route generally chosen by fur traders for many years. Champlain, from Georgian bay, reached Lake Ontario by the Trent valley trail. The pioneer settlements were located around the forts at Detroit and Niagara. The United Empire Loyalists, who were among the first to enter the province, about 1785 began to make clearings along the River St. Lawrence, the Bay of Quinte and in the vicinity of Niagara and Detroit. Those who went inland usually chose property so situated that they might reside near a stream, down which in summer they could journey by canoe, and which, when frozen in winter, afforded a convenient means of travel on the ice. Others frequently located in the vicinity of an Indian trail. As the number of settlers increased the trail became a bridle path, then a wagon track, and ultimately resulted in one of the many "trespass" roads of to-day."

14. Railways and Canals.

References :

- (a) First things in Canada, 1897 (3rd edition) by George Johnson, pp. 27-38, 145-149.
- (b) Ontario municipal commission, report 1889, part II, p. 27.
- (c) Annual reports of the Department of Railways and Canals.
- (d) Year book of Canada, 1895 and 1896.
- (e) Waterways of Canada, by Mr. Hugh McLennan of Montreal (*The Gazette*, Oct. 30, 1883).

The early route of the fur traders was from La Chine up to Ottawa, across Lake Nipissing, down French river and by way of St. Mary's river to lake Superior. A small canal was constructed for the use of the North West Co. at the Soo on the Canadian side at some time between 1797 and 1800. The present canal was constructed 1887-95; short canals at the rapids of the St. Lawrence were constructed 1779-81. "They were enlarged in 1804 and 1817 and were abandoned in 1845." The Lachine canal was constructed 1821-25, and the Welland canal 1824-29.

In 1809 the Accommodation made the first steam voyage from Montreal to Quebec. In 1816 and 1817 the Frontenac was built at Finkle's Point near Bath (Lennox and Addington). The Rideau canal, begun in 1827, was completed by the Imperial government in 1834 and for several years was a convenient water way for the immigrants coming to Upper Canada until the enlargement of the St. Lawrence canal in 1847 permitted direct passage up the river to Prescott and Kingston.

"The total cost of the canals of Canada to 30th of June 1896 was \$80,925,522 of which \$20,692,244 was spent before Confederation, \$4,173,921 being expended by the Imperial government."

Rev. Dr. Wilkes in speaking of travelling in 1812-22 says: "The mode of proceeding most easily from that place (York) to this (Montreal) was by the steamer Frontenac, paddle wheels not much greater than a racing buggy and taking some two days to reach Kingston; thence in a batteau to Lachine whence a caleche was the conveyance. If the land journey was taken the Royal mail coach, albeit often a lumber wagon, left York at noon on Monday, delivering letters and passengers in Montreal on Saturday at noon, thus taking five days from York to Montreal." (*Gazette*, Montreal, Oct. 23, 1883.) At the present time we can leave Toronto at 9 o'clock a.m. and arrive at Montreal at 6.30 p.m.—nine and one-half hours.

In 1836 the first passenger railway in Canada, the Champlain and St. Lawrence Railway, was opened from Laprairie to St. Johns, Que. In 1848 a road seven miles long connected Montreal with Lachine above the rapids. The Northern Railway was opened from Toronto to Bradford in June 1853. The first train ran to Aurora on May 16, 1853. The Grand Trunk from Montreal to Toronto was opened in 1856, and from Toronto to Sarnia in 1858. First C. P. R. through train crossed the Rockies in 1886.

Up to June 30, 1897 the amount of government and municipal loans, bonuses, etc. promised railways amounted to \$207,133,264. Of this the Ontario Legislature had given \$7,357,116 and the municipalities of Ontario \$12,420,753.

The paid-up capital of all the railways was \$921,858,232. The number of miles run by trains in the year was 45,780,851. The number of passengers carried was 16,171,338. The freight traffic amounted to 25,300,331 tons.

Mileage of Railways in Canada.

Year	Miles in Ontario.	Miles in Canada.	Year	Miles in Ontario.	Miles in Canada.
1836.....	..	16	1867.....	1,352	2,278
1846.....	..	16	1877.....	2,852	5,218
1847.....	..	54	1887.....	5,383	11,793
1857.....	986	1,444	1897.....	6,626	16,550

15. *Oxen and Horses.*

The passing of the ox as a beast of burden may be seen from the following figures :

	1851. No.	1861. No.	1871. No.	1881. No.	1891. No.
Oxen	192,140	99,605	47,941	23,263	12,424
Horses	201,670	377,681	489,001	590,298	771,838

16. *Pioneer Life.*

Very interesting accounts of pioneer work and life may be found in the following :

Authentic Letters from Upper Canada, by T. W. McGrath, Dublin, 1833.

Twenty-seven Years in Canada West, by Major Strickland, London, 1853.

Country Life in Canada Fifty Years Ago, Canniff Haight, Toronto, 1885.

17. *Expenditure in behalf of Agriculture by the Legislature of Ontario.*

	1868. \$	1869. \$	1870. \$
Salaries	800	800	800
Agricultural Societies	54,074	53,894	53,424
Provincial Fair	10,000	10,000	10,000
Fruit Growers' Association	350	850	350
Miscellaneous	236	480	401
Total	65,460	65,524	64,985
Total for three years, 1868, 1869, 1870	\$195,969		
	1895. \$	1896. \$	1897. \$
Department	17,490	17,789	17,745
Agricultural Societies	74,747	74,325	73,738
Other associations	21,123	22,696	19,127
Reports and bulletins	15,121	15,708	11,030
Ontario Agricultural College :			
Salaries	26,012	27,737	27,956
Expenses	25,959	26,916	26,980
Capital account	19,304	21,044	8,844
Bureau of Industries	4,886	4,774	3,773
Farmers' Institutes	7,667	10,522	10,489
Travelling Dairies	2,066	1,971
Dairy Schools	20,375	9,306	14,599
Experimental Fruit Stations	1,941	2,635	2,441
Fruit spraying	2,028	2,130	2,692
Pioneer Farm	5,482	3,791	1,612
Good Roads	2,151	5,603
Miscellaneous	250	1,800	1,800
Total	244,452	245,295	228,409
Total for three years, 1895, 1896, 1897	\$718,156		



