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CLIMATE FLUCTUATION AND AGRICULTURAL CHANGE
IN SOUTHERN AND CENTRAL NEW ENGLAND, 1765-1880¹

Much of nineteenth-century Maine agricultural history is a story of failed potential and missed opportunities. The period also might be described as one of social and political unrest as this area of somewhat marginal agriculture felt many pressures. Observers then and historians since have dealt extensively with the perceived problem of “keeping the boys at home,” as the state never achieved its anticipated population because of out-migration, either to the cities of the East or the welcoming farm lands of the West. Poor lands at home, the decline of lumbering, the rich and fairly cheap lands of the West, and a seductive propaganda from other areas are usually given as the reasons for the shortfall. In response, Maine leaders advocated better education, state support for agricultural colleges, subsidies on crops, propaganda of their own, and increasingly new and exotic crops to provide necessary profit margins to keep Maine’s people at home. Still, the flight persisted.²

This work suggests that although much of the previous analysis was and remains correct, that analysis did not go far enough. It did not deal with a root cause of the decline, the fact that Maine agriculture was in a climatic stress situation. What follows is a case study of the impact of weather fluctuations on the society of Maine. Variability *within* climate as opposed to variability *of* climate adversely affected the farmers’ decision-making regarding the planting of potentially profitable cash crops.³

The Maine climate throughout the period 1765 to 1880 was generally cool, with short intervals of warmer weather. These warm intervals raised expectations of an agricultural boom, which were dashed when the climate reverted to cool conditions. The weather variability was at the bottom of Maine's agricultural history problems.

Over the past four years the authors have been reconstructing a climate record for Maine, with emphasis on the prime agricultural area of Kennebec County, still the finest agricultural valley in the state. This research has involved compilation of several climatological records.⁴

Figure 1 shows a temperature and precipitation record reconstruction for southwestern Maine during the period 1768 through 1810. This reconstruction was assembled by systematically analysing the content of daily weather descriptions found in two manuscript diaries, one kept by Rev. Isaac Hasey of Lebanon (1764-1809) and the other by the Rev. Tristan Gilman of North Yarmouth (1770-1807). Regression analysis was conducted comparing our data to early instrumental records from the Boston area for the same time period. Results show that the reconstruction is a valid one given the expected error factors inherent in comparisons between differing climate zones and geographical conditions. Figures 2 and 3 are temperature and precipitation reconstructions based on instrumental records from south coastal Maine, including Brunswick and Portland (1808-1980) and from Kennebec Valley at Gardiner (1837-1980). In addition to these records, reconstructions based on ice-out and freeze-up dates for major rivers were utilized as well as local phenological accounts on the time when trees began to leaf, when corn began to show its spindles, and when certain flowers came into bloom.⁵

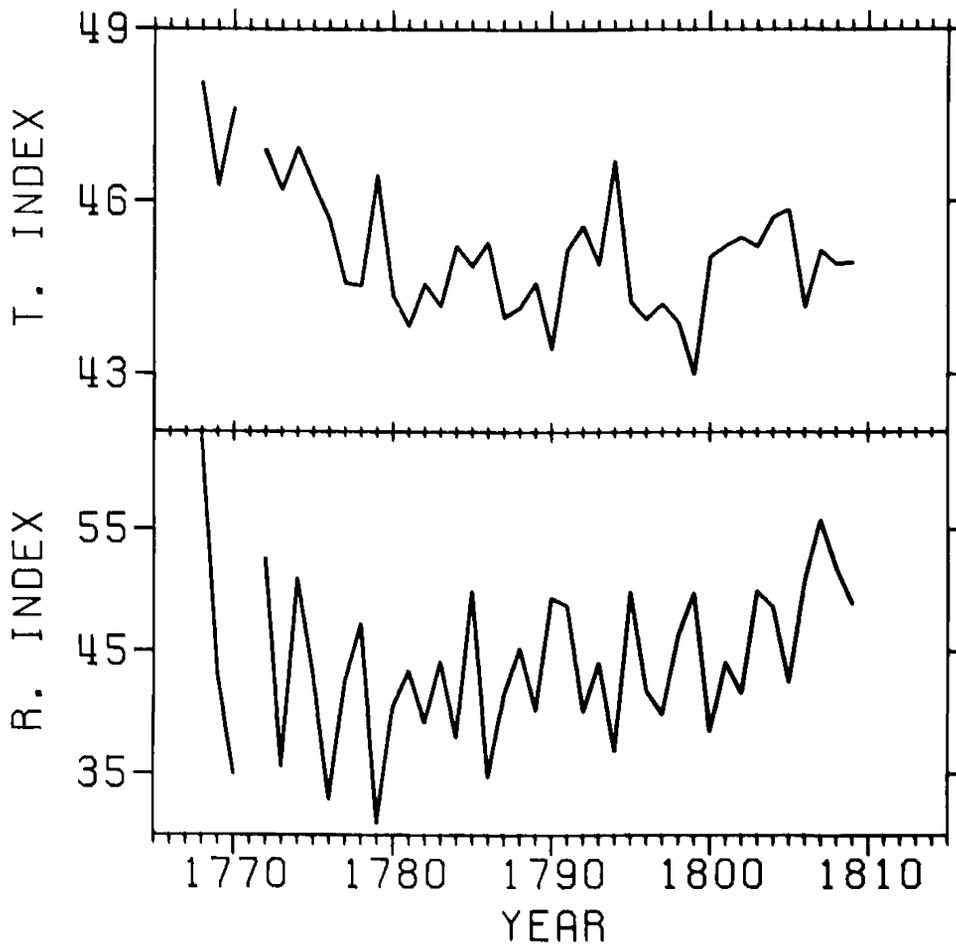


Fig. 1 Content Analysis Reconstructions (Hasey and Gilman Diaries)

Detailed analysis of these records shows temperature and rainfall peaks in the 1760s, sliding off precipitously to the very cool and somewhat drier period from 1775 to 1820. Some unusual years appear in this time period (warmer and even drier for a few years such as 1784, 1786 and 1792, as well as the mid-part of the first decade of the nineteenth century, and, of course, the cooler and drier period of the disastrous, volcanically influenced years, 1816-1818).

For the men and women who settled in Maine after the American Revolution (a heavy influx of Massachusetts military veterans came to Maine on war bounty lands,

beginning about 1780) this cool spell (1775-1820) was their "normal" period. When the temperature began to moderate in the 1820s, it was difficult for them to adjust, and they began to anticipate a warmer change than was forthcoming. The amount of comment from observers was substantial. Many felt that the warmer period presaged a very large increase in temperature. Some felt that the cutting of the original forest cover was the reason for the amelioration, both because the snow did not lay as long in the woods, and the runoff was quicker, but also because the sun's rays penetrated better. Farm newspapers, reports of the federal agricultural department, and books written about the area all discussed the new theories. Most felt that new crops were

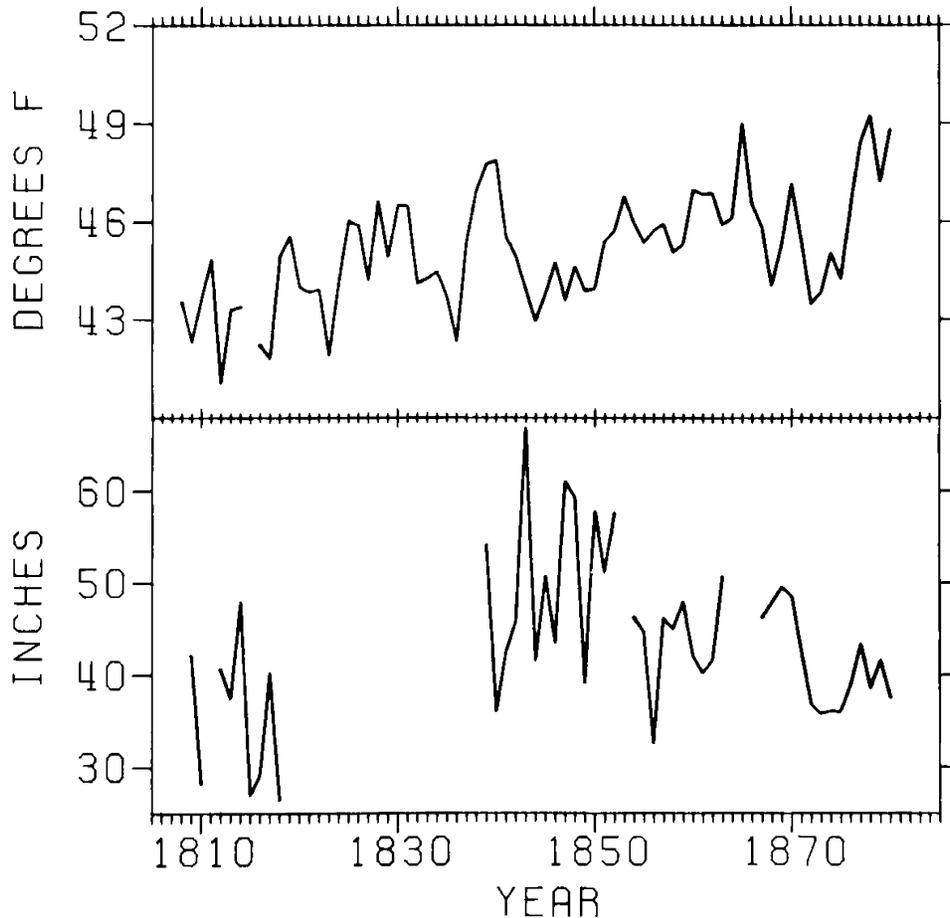


Fig. 2 South Coastal Instrumental Record

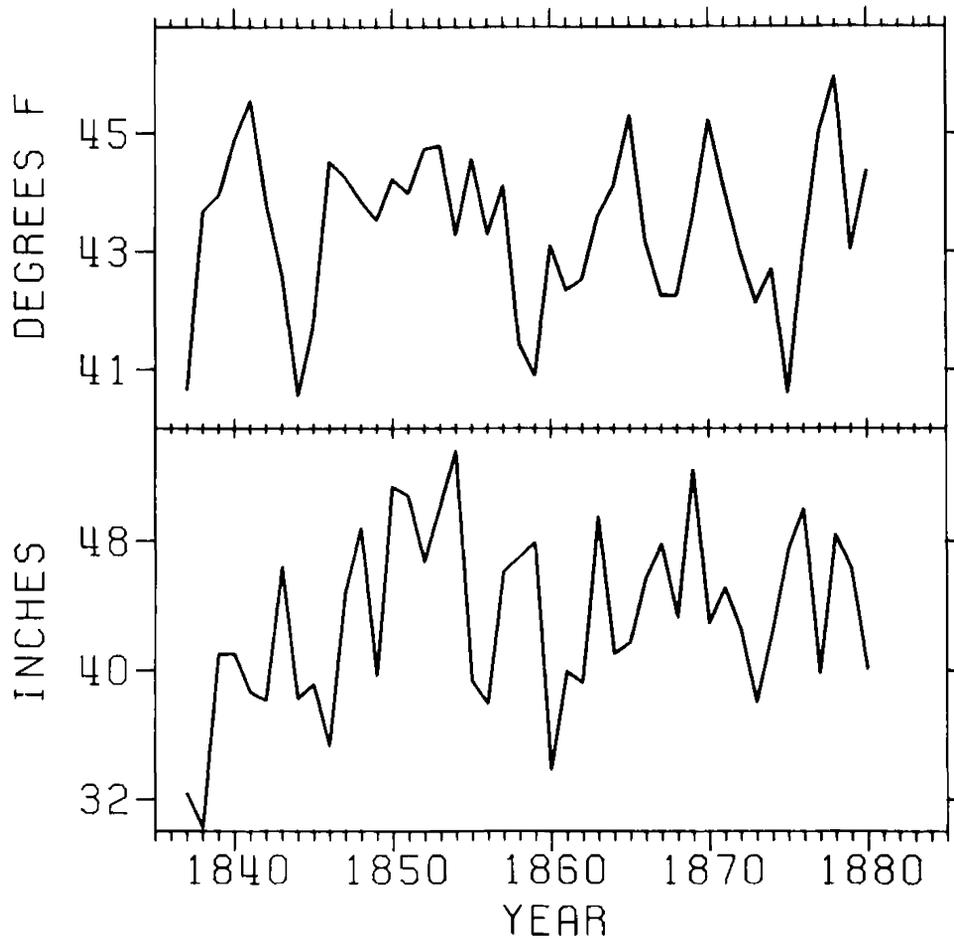


Fig. 3 Gardiner Instrumental Record

needed to meet these new conditions, as well as new techniques. The warmer conditions of the 1820s persuaded most farmers that the opportunity to grow more and better cash crops was at hand. This is the period when the silkworm craze was at its height, which gives some indication of the extent of the hopes. For all these reasons the decline (or return to a more normal regimen) was felt more savagely when it did come.⁶ A good example of comment is that of the *Oxford Observer* of December 17, 1826. The fall in northern Oxford County had been mild and pleasant. The Kennebec was navigable to December 19, and even the Penobscot was used for trade

until December 13. The paper, when reviewing the recent weather, remarked:

Our winters are much more mild than formerly: whether this is owing to the forests being cleared, or the ice melting at the north, we know not – but it is certainly a fact which is attested to by every person who has any recollection on the subject.

In fact, a second decline, lasting fifteen years, set in during the early 1830s, which featured substantially cooler yearly mean temperatures and with somewhat greater precipitation that often occurred in the fall harvest months. Precipitation continued to increase somewhat until nearly 1885; consequently conditions were cool and increasingly damp. Thereafter, the yearly mean temperatures rose while yearly precipitation declined until the end of the century.

At the beginning of the period under discussion, the growing season was shorter than in our time (see table 1). Killing frosts were not unusual in late May, and occasionally they occurred in June. In the fall, killing frosts often came in early September and sometimes as early as middle to late August. Between 1760 and 1819, the length of the growing season fluctuated from a high of 203 days in 1807 to a low of 64 in 1816. During this period, the growing season averaged 16 days shorter than today's. Farmers constantly worried about their crops. Many seeds were planted indoors and transplanted after the frosts had passed. Harvests were sometimes damaged by early frosts. Even such a regular occupation as haying usually was begun in late July and carried on into August, where today the first of what is often two cuttings may begin in June and is ordinarily complete by mid to late July.⁷

TABLE 1
GROWING SEASON LENGTH FOR SOUTHERN MAINE

Decade	Mean Length	Standard Deviation	Shortest Season/Year	Longest Season/Year
1760s	131	32.1	93/1764	185/1766
1770s	124	21.1	97/1775	159/1778
1780s	132	26.8	94/1789	165/1785
1790s	155	17.3	125/1793	180/1794
1800s	147	28.6	111/1801	203/1807
1810s	124	24.5	64/1816	152/1818
1820s	176	13.7	151/1824	185/1821
1830s	178	21.3	146/1836	207/1831
1840s	159	28.1	110/1845	191/1843
1850s	163	20.6	130/1860	190/1851
1860s	187	23.2	157/1868	224/1866
1870s	206	13.2	183/1876	224/1873
1920-49	162	14.0	112/1944	204/1938
1950-79	144	15.4	110/1961	182/1970

As the warming trend of the late '20s persisted, diarists and other observers noted changes in the crops. The most usual remark during this period was that Indian corn was an assured crop, although, it had been a problematical one at this latitude earlier. As we shall see, more exotic crops were often suggested during the warm period, as the older crops, buckwheat, rye, wheat, and barley, began to suffer from insect depredation, as well as lodging problems when harvested in the wetter weather with the scythe, which was usual in the smaller acreages until the end of our period.

For persons living during the warming period, the 1820s heralded good times. For that reason the period of cooler, more difficult weather from roughly 1830 to 1845 came as a great shock. Frosts occurred in low-lying areas in July, 1831. Later, cool summers generally prevailed, and, in the fall, very heavy rains often fell.

These were followed by severe snow storms, high winds, and very cold winter weather. This cold weather, combined with increased snowfall, hampered transportation and severely damaged fruit trees. Springs were backward and planting often was late over this period.⁸

One newspaper, in June, 1832, reported that the prospects for farmers were “dim and they are discouraged.” The next few years were no better. Added to the weather were disease problems, such as scarlet fever and cholera reported in sheep and humans, along with a wheat blast or rust, and the beginning of the potato blight. Throughout the 1830s and into the 1840s these difficulties or similar ones were reported continually, and newspapers began to print large numbers of summaries of weather diaries, lists of snow storms, cold temperatures, depths of snow, and other melancholy data. Over and over again the seasons are described as “uncommonly cold and wet.”⁹

In 1836, the leading newspaper of the area, the *Maine Farmer*, took cognizance of the impact of this severe weather and printed among the first of many articles and leaders in this and other newspapers on the migration to more profitable climates. Some observers began to discover cycles in the weather – the most prominent theories revolving around a seventeen- or nineteen-year sequence. By 1838 several editors observed that for the past seven years most farmers had had a severely curtailed, if not destroyed, Indian corn crop. Some newspaper commentators began to advocate a shift to root crops to escape the severe weather.

More analysis of the cyclic theories occurred throughout the early 1840s, some of it based on references to diaries from more than a century before. Maine farmers, scientists, editors, and politicians were all disturbed both by the weather and by the out-migration.

This litany continued in much the same form until the mid-1870s. Less attention was paid now to the detail of the weather and the cyclical theories were not so much discussed, perhaps because of a slightly warmer period from 1844 to 1855. Farmers were now apparently agreed that the warm weather of the 1820s was the unusual weather, and they devoted their efforts to attempting to stem the tide of migration, mostly by creating an agriculture that would deal with this reality of colder, wetter weather with its less sure crops. Even when the warm weather came at the end of this period, Maine farmers were still seeking solutions to their problems, and it was the new crops, coupled with scientific agriculture, that occupied their minds and their newspapers. Looking back on the period one is struck by the depth of the analysis in the short run and by the impact of the weather fluctuations in the long run.

Prior to 1830 the farming in the Kennebec region was primarily subsistence farming. Some farmers, especially in southern sections, cut hay and cordwood for the Boston market, but most crop sales were to lumbermen (oftentimes themselves part-time farmers) in the local area. With the warmer climates of the 1820s and a somewhat diminished population drain as well, farmers began to search for cash crops. Unfortunately, this search coincided with an adverse climate variation as well as considerable competition opened up by the Erie Canal, which permitted the transportation of produce from the rich agricultural lands of Ohio, Indiana, and Illinois. In 1841, for instance, Maine raised substantial amounts of wheat (ranking 15th in the Union), barley (2nd), potatoes (2nd), hay (6th), and wool (7th in 1839 figures). The wheat production was declining rapidly, however. By 1870 the leading crops were potatoes and hay, and the land was rapidly becoming an area of abandoned farms. Both western competition and better transportation

exacerbated the rural decline set in motion by the frequent weather fluctuations.¹⁰

In the 1830s, it was not unusual for a farm to raise wool, lamb, mutton, turnips, corn, wheat, beans, peas, pork, butter, cheese, fruit, and hay, and to sell fuel wood. In 1834 one such farm in this area produced hay, potatoes, apples, pears, parsnips, beets, carrots, onions, corn, beans, grapes, cabbage, cucumbers, cider, currants, and turnips, and the proprietor offered grape vines, mulberry trees, and other fruit trees for sale. However, even with this brave start, the farm itself was on the market by 1841.¹¹ Of the older, pre-1820s crops, wheat hung on longest, artificially encouraged by the impact of a massive newspaper campaign urging farmers to raise their own wheat as a measure of their independence from “foreign” elements, and with the aid of a state-paid subsidy to wheat and corn growers in the 1830s. By the end of the decade the legislature was no longer willing to subsidize this venture in a falling market now controlled by midwestern wheat producers.¹²

Newspaper editorials, in addition to supporting the subsidy, urged farmers to “Raise More Pork,” announced that “Sheep was the answer,” and called for the “cultivation of the apple.” In fact, the apple was an adjunct export, usually carried in vessels laden with ice. Potatoes also provided a substantial trade to the slave states until the blight and objections to the support of slavery tended to diminish this trade substantially.¹³

Agricultural societies in the area, seeking a scapegoat, blamed mothers and daughters for not making a soft enough home and young women for enticing their young men into lives of “vice and extravagance.” Others called for the establishment of German and Swedish migrants on the abandoned and cutover lands, apparently feeling that these hardier persons from northern latitudes might be able to make Maine pay.¹⁴

A farmers' newspaper was begun in the heart of the region in 1833, with the object, according to the first number, of "*the mutual improvement of the Farmer and Mechanic . . .*," especially in the "Siberian portion (as it has been churlishly called) of the Union." The editor remarked that it was "a time for patriotism as the Union was tottering," and the foundation must be "an active, intelligent, enlightened and enterprising yeomanry." A nearby county agricultural society, somewhat more mundanely, called for cultivation of corn, raising cattle for droving, as well as some wheat and potatoes, and urged the application of lime. This was in 1845. By 1857, another analyst confined his suggestions to hay, potatoes, some corn, urged his listeners to grow oats for feed, and ended his speech by proposing compost heaps and scientific education.¹⁵

Others, less sanguine of the possibilities than these observers, were blunt. One newspaper report remarked strongly in 1844 that:

No sophistry can prevent our arriving sooner or later at the bold position, *that our agriculture is ruined, unless we can turn our attention within ourselves and learn to compete successfully on our own soil with the farmer in the fertile valley of the West!*

When the Maine State Board of Agriculture was created in 1856 in response to these problems, the first secretary sent out a questionnaire of thirty questions dealing with the methods of farming, and crops, but question thirty was the key: "How many in agriculture have emigrated since 1850?" "Why and Where To?" The results were unpleasant and the secretary said that if they were true, Maine had better submit in good grace. He might have mentioned the old song that dealt with the problem cleanly enough and which was sung widely by those leaving, and perhaps by those who remained as well.¹⁶

Come all ye Yankee Farmers
 Who'd like to change your lot,
 Who've spunk enough to travel
 Beyond your native spot,
 And leave behind your village
 Where pa and ma do stay,
 Come follow me and settle in
 Mich-i-gan-i-a.

Population figures show actual declines from 1850 to 1880, and even before that the growth is less than should have occurred.

TABLE 2¹⁷
 KENNEBEC COUNTY POPULATION

Year	Population
1830	38926
1840	51384
1850	57908
1860	55655
1870	53223
1880	53601

Of course, some stayed in Maine and for them the remainder of the period was often a sorrowful history of bad weather, poor crops, and exotic replacements. These will take but a short time to list. However, it is instructive to note how far afield these farmers were willing to look in an attempt to save their lifestyle, but how far they were from dealing with the real problems: the competition from elsewhere and the failure to perceive the limitations imposed by the varying climate. Among the potential crops mentioned were cheese and butter making, hemp (the state paid a subsidy here for

a brief period!), sugar beets, sweet corn, flax, grapes, sunflowers, chestnuts, broom corn, maple sugar, winter wheat, silk worms (and their necessary mulberry trees, of which more than forty thousand were planted!), sweet potatoes, hops, blueberries, and cranberries.

Some of these were offered in warm periods, others for cooler ones. Other prescriptions included deeper plowing, ditching, draining, reclaiming swamp lands, and, of course, the universal panaceas: public education, school books, mandatory courses in soil chemistry, cooperative efforts, farmers' clubs, and, finally, the establishment of the University of Maine in the mid-1860s, with a state supported experiment station by the mid-1880s. No one proposed modifying the climate, leaving those ideas to a later time.¹⁸

Some Maine farmers were more adept at dealing with changing conditions. Eventually, when the blight diminished after the period of the Civil War, the potato was to be their major answer to these climate problems. But in the earlier period, the best solution was to choose a cash producer that lay outside the climate variables to a great extent. The major source of income that was relatively less dependent on good weather was the raising of beef cattle for market. A poor weather year might damage the hay crop, but when this happened farmers simply sold their cattle earlier.

A regular market was held outside of Boston, at Brighton, each week where beef cattle, stores (young stock, oxen, heifers), sheep, swine, and even fowl, especially turkeys, were sold at auction. This market, which dated from the late Revolutionary War days, provided most of the meat for the growing city of Boston. In the earlier days, New England farmers drove their cattle overland to this market. By 1820, or even earlier, regular groups of drovers began to purchase the cattle,

drive them to a central location, sometimes fatten them, and then proceed to market the animals in a regular way. The fall of each year was especially busy as farmers disposed of the cattle they did not expect to be able to feed over the winter. The center of the droving trade in Maine was in Kennebec County, and it fanned out throughout the state, with this area as the main location. Table 3 shows the numbers of cattle sold at the Brighton auction block each year from 1833 through 1880.¹⁹

It is difficult to tell exactly how many of these cattle came from Maine, but a substantial amount were from that locality, until railroad competition from the West began to cut into the market in the 1850s. Some Maine products were large and extra fat, commanding high prices and eliciting comment, as in 1836. In that same year nearly ten thousand cattle, passing in droves, were counted by a single person in southern Maine. In 1838, the local agricultural society reported that “immense herds of stock and sheep have been sent to Brighton” Some cattle from the western half of the area were driven to Quebec as well.

Steamboats carried cattle upon occasion, but more often they were used to carry hay for the market, which also amounted to a very large trade. As the potato blight emerged in Maine, and the grain rust damaged that crop, farmers increasingly began to rely on hay and cattle as cash crops. At the Kennebec County Agricultural Fair in 1845, cattle were so prominent that Massachusetts observers travelled to see the exhibition. By the 1850s, however, the trade had diminished in the face of railroads from the West and perhaps influenced by warmer temperatures. Once the rails made their way to central Maine in the 1850s, the trade picked up again slightly. Through the 1860s and 1870s (another period of cooler temperatures), although quite active, especially as farmers in northern Maine sold their cattle to itinerant drovers

who moved the cattle to the central railroad depots for transshipment, the trade suffered in comparison to its competition. It had helped the farmers in a time of need but was not sufficient. Newspapers continued to carry the price quotations and stories on the numbers of cattle sold. Maine drovers, especially in the west and north of the state, continued to do their work, but in central Maine, those farmers that remained sought crops with specialty markets, such as apples, cranberries, butter, and milk.²⁰

Farmers in Maine found themselves under pressure throughout the period in review. At first the climate was very severe, and farming was of a subsistence nature primarily. Later, as the climate ameliorated somewhat, population increased, and fairly large-scale commercial agriculture was begun. Soon the state began to show a decline, however, in many of these crops. Historians have traditionally described this as the impact of western migration, better, cheaper land elsewhere, and as the result of the transportation revolution begun by the Erie Canal and hastened by railroads. All these were important. But in Maine more farmers might have survived the competition if the climate had remained consistent. In fact, it worsened at the very time the competition began to be strong. Recourse to new crops and other efforts to improve the profit margin stayed the decline somewhat. However, with the Civil War over and a renewed period of cooling, the decline became precipitous. Just as the major climatic amelioration of this past century began, Maine found itself suffering its worst farming period. The climate was not kind, and ultimately it deserves a share of the blame, or credit, for the story of Maine agriculture in the period 1765 to 1880.

TABLE 3
ANIMALS AUCTIONED
BRIGHTON MARKET, 1830 - 1880

Year	Beef	Sheep	Swine	Maine Cattle	Maine Sheep
1830	37767	132697	19639	—	—
1	33922	84153	26371	—	—
2	40807	100853	14697	—	—
3	49180	90722	17408	—	—
4	36382	93766	27844	—	—
5	51096	98100	23142	—	—
6	38504	82830	15667	—	—
7	32644	110206	17052	—	—
8	25830	104640	26104	—	—
9	23624	92400	26088	—	—
1840	34160	124722	32530	—	—
1	36607	126850	31872	—	—
2	32970	106665	39935	—	—
3	37340	92274	52740	—	—
4	37610	98820	43060	—	—
5	48910	107960	56580	—	—
6	38670	105350	44940	—	—
7	43425	133850	62015	—	—
8	40784	146755	87890	—	—
9	46465	148965	80120	—	—
1850	42830	164170	78230	—	—
1	76830	183880	80830	—	—
2	70592	244765	93215	—	—
3	67600	197707	85702	—	—
4	67397	206587	70995	—	—

6	62350	163029
7	55860	127775
8	59720	145800
9	61850	162290
1860	63245	188800
1	53785	128750
2	58120	155650
3	84186	187519
4	97435	167143*
5	115360	335955
6	117522	426314
7	105904	411884
8	106208	463613
9	133663	395971
1870	127737	428671
1	131238	465673
2	133321	377403
3	147450	426367
4	150681	366672
5	124511	349971
6	136579	346112
7	155907	346647
8	161131	166740
9	172316	255307
1880	229894	470449

* (10 months data)

** (9 months data)

*** (8 months data)

101316	—	—
84184	—	—
55785	—	—
41630	—	—
46322	—	—
62185	—	—
36017	—	—
63675	12630	9576
	(last 4 mo)	(last 4 mo.)
50178*	7906	11269
72088	11364	22101
84465**	9795	24584
96919	9311	23897
—	10028	7613
140000	9082	7644
148324	17233	10940
310608	20976	12380
542545	3629	—
846278	661***	—
564570	3348	—
332216	2489	—
390565	1334	—
359101	11412	—
434962	14479	—
511545	13781	—
751198	—	—

NOTES

¹ The authors are indebted to Wibjorn Karlen, James Fostook, John Litvay, Geoffrey Gordon, and Hubert Lamb for their encouragement and help with the collection and analysis of climatological data. Research was partially supported by a University of Maine at Orono Faculty Summer Research Grant, funds from the Maine Agricultural Experiment Station, and National Science Foundation Grants ATM 7908415 and ATM 8019514.

² Some of the more important work that traces various emigration themes are Percy W. Bidwell and John I. Falconer, *History of Agriculture in the Northern United States, 1620-1860* (Washington, D.C.: Carnegie Institution, 1941); Paul W. Gates, *The Farmer's Age, 1815-1860* (New York: Holt, Rinehart and Winston, 1969); Stewart H. Holbrook, *The Yankee Exodus: An Account of Migration from New England* (Seattle, Wash.: University of Washington Press, 1950); Andrew H. Clark, "Suggestions for the Geographical Study of Agricultural Change in the United States, 1790-1840," in Darwin P. Kelsey, ed., *American Agriculture, 1790-1840: A Symposium in Agricultural History* 46 (1972): 155-72; Clarence A. Day, *A History of Maine Agriculture, 1604-1860*, University of Maine Studies Series, No. 68 (Orono, Me.: University of Maine Press, 1954); and David C. Smith, "Towards a Theory of Maine History," in Arthur Johnson, ed., *Explorations in Maine History* (Orono, Me.: University of Maine, 1970), pp. 45-64

³ For a fuller discussion of the concept of climate fluctuation see William R. Baron, "Eighteenth-Century New England Climate Variation and Its Suggested Impact on Society," to be found elsewhere in this number of the *Maine Historical Society Quarterly*.

⁴ Our research organization, the Northeastern Environmental Research Group, is described in the preface of William R. Baron *et al*, *Long-Time Series Temperature and Precipitation Records for Maine, 1808-1978*, University of Maine Life Sciences and Agriculture Experiment Station, Bulletin 771, Orono, August 1980, pp. i-viii.

⁵ The content analysis methodology employed is discussed in William R. Baron, "Tempests, Freshets and Mackerel Skies: Climatological Data from Diaries Using Content Analysis" (Ph.D. dissertation, University of Maine at Orono, 1980). The Hasey and Gilman diaries may be found in manuscript form at the Maine Historical Society, Portland, Me. The materials used to reconstruct Maine instrumental records and the statistical methodology employed on them is described in Baron *et al*, *Records for Maine*, pp. 2-4, 13-38,

65-91. Sources of phenological reconstructions are the following manuscript diaries: John Cushing (Freeport), 1787-1811; Benjamin F. Robbins (Winthrop), 1813-1816; Caleb Bradley (Portland), 1800-1860; Samuel Leighton (Eliot), 1818-1848; Stephen Longfellow (Gorham), 1771-1788; George Cobb (Buckfield), 1833-1881; Chamberlain Family (Bristol), 1830-1929; Henry Knox Farm Journals (Thomaston), 1788-1806, and Edmund and Tobias Walker (Kennebunk), 1828-1893, all at the Maine Historical Society, and Martha M. Ballard (Hallowell), 1785-1812, and Henry Sewall (Augusta), 1775-1842, both at the Maine State Library, Augusta, Maine. Published materials include William Willis, ed., *Journals of the Rev. Thomas Smith and the Rev. Samuel Deane in Portland* (Portland, Me.: J. S. Baily, 1849); "Joshua Whitman Diary for North Turner, 1800-1842," *Maine Farmer*, June 10, 1836, July 25, 1837, Jan. 16, 1838, and May 21, 1842; and David C. Smith, *A History of Lumbering in Maine, 1861-1960*, University of Maine Studies, No. 93 (Orono, Me.: University of Maine Press, 1972), appendices 2, 4, and 5, pp. 432-39.

⁶ This is based on a wide variety of sources. Examples include Moses Greenleaf, *A Survey of the State of Maine* (Portland, Me.: Shirley and Hyde, 1829), especially pp. 85-91; J. C. Gray, "Remarks on the Climate of New England," in *Report of Commissioner of Patents, 1854*, 33rd Cong., 2nd Sess., Senate Executive Doc. No. 42, pp. 423-75, especially pp. 423-48. Newspaper articles discussing these matters occur in *Maine Farmer*, March 11, 1833; Jan. 16, 1835 (relating to eclipses of the sun to weather); April 15, 22, 29, May 6, 1836 (a series); Oct. 21, 1836 (cycles). Many others might be adduced.

⁷ The methodology used to reconstruct the southern Maine growing season record is outlined in William R. Baron *et al*, "Frost-Free Season Record Reconstruction for Eastern Massachusetts, 1733-1980." The sources used are described in note 5 above.

⁸ The last killing frost in the spring averaged eight days earlier in the 1820s as opposed to the period 1830-45. First frosts in the fall were nine days earlier in the 1840s than in the 1820s, for a total reduction in the growing season of seventeen days.

⁹ These paragraphs are based on the diaries mentioned before and on close analysis of a number of newspapers from the area, especially the *Christian Intelligencer* (1831-36); *Sandy River Yeoman* (1831-32); *Yankee Farmer* (1838-40); *Maine Farmer* (1833 to the end of our period); *Drew's Rural Intelligencer* (1854-58); *Farmington Chronicle* (1845-75); *Franklin Register* (1840-42); *Hallowell American Advocate* (1831-32); and *Oxford Observer* (1823-27). Significant articles that do more than just

report happenings are in the *Christian Intelligencer*, Sept. 23, 30, 1831; Feb. 3, 1832; *Maine Farmer*, July 29, 1833; April 29, Oct. 7, 1836; Feb. 29, May 9, 1840; March 27, July 3, 17, 1841; May 7, 14, Aug. 27, Sept. 3, Oct. 1, 8, 15, 22, 19, 26, Dec. 10, 1842; Dec. 6, 1849; March 7, June 3, 1850; *Yankee Farmer*, Jan. 13, 1838. Many of these articles are by a remarkable observer and analyst, Joshua Whitman of North Turner.

¹⁰ Statistics gathering in the area of agricultural production is suspect at the best of times, and before 1870 it is very weak. Still, these do indicate the best of knowledge then. These cited come from the *New England Farmer*, March 9, 1842, and were furnished by the commissioner on patents. Later figures are found in the United States Department of Agriculture, *Fluctuations in Crops and Weather, 1866-1948*, Statistical Bulletin No. 101, Washington, D.C., 1951.

¹¹ The farms described that demonstrate these conditions are those of Steward and Wadsworth Foster of Winthrop (the one in the text), *Maine Farmer*, Dec. 19, 1834; May, 1841; another Winthrop farm, May 9, 1837; one in Topsfield, Dec. 20, 1849, where today only a cellar hole, lilacs and golden glow remain; Livermore, Feb. 21, 1850; New Lebanon, Shaker Village, Feb. 7, 1850, and in Penobscot County, April 11, 1850.

¹² On the wheat bounty, the report of the agricultural committee of the Maine legislature appeared in the *Maine Farmer*, March 21, 1827. Other comments are in the *Maine Farmer*, March 28, April 4, July 18, Aug. 22, 1837, and a later article readvocating it, Nov. 6, 1838; *Yankee Farmer*, March 24, 31, April 14, 1838, analyzes the yield and the results of the bounty.

¹³ On pork, the editorial in the *Yankee Farmer*, June 9, 1838; on wool and sheep, *Maine Farmer*, June 6, 1834, Feb. 19, 1836; *Yankee Farmer*, Nov. 28, 1840; *Franklin Register*, April 4, 1844 (annual report of the Franklin County Agricultural Society). Ezekiel Holmes wrote a book on the subject, *The Northern Sheperd* (Winthrop, Me.: William Noyes, 1835). On apples, *Norway Advertiser*, March 24, 1831; *Drew's Rural Intelligencer*, Nov. 17, 1855. On potatoes, *Farmington Chronicle*, Jan. 18, Nov. 6, 1845. These are all stories that deal with the trade itself.

¹⁴ Wives and daughters are pilloried in the *Oxford Democrat*, Sept. 18, 1855, and young women are taken severely to task in the *Farmington Chronicle*, Dec. 2, 1847, "Report on Committees of Ladies Manufactures of Franklin County Agricultural Society." Proposed German migration was the subject of Maine Senate Document No. 22, 1857, and the

Swedish migration actually occurred, with the appointment of immigration commissioners and much state aid. This story is told in Smith, *History of Lumbering*, and David C. Smith, "Maine and Its Public Domain: Land Disposal on the Northern Frontier," in David Ellis, ed., *The Frontier in American Development* (Ithaca, N.Y.: Cornell University Press, 1969).

¹⁵ *Maine Farmer*, Jan. 21, 1833; *Farmington Chronicle*, May 31, 1845, "Report of Trustees of Franklin County Agricultural Society; *Oxford Democrat*, Nov. 13, 1857, address by A. L. Burbank to Bethel Farmers' Club, on Oct. 14, 1857.

¹⁶ The quotation is from the *Franklin Register*, April 4, 1844, "The Annual Report of the Franklin County Agricultural Society." This is an important and significant document. On the questionnaire, see S. L. Goodale, the secretary of the board, to *Drew's Rural Intelligencer*, June 7, 1856. *The First Report of the Maine Board of Agriculture*, Aug., 1856, analyzes the results. The song, widely sung in Maine at this time, was noticed first in the *Sandy River Yeoman*, July 4, 1832. Eleven verses appear, all with the same theme. Some observers were filled with a sense of frustration, as when the *Yankee Farmer*, Oct. 17, 1838, quoted the *Pawtucket Gazette* to the effect that farmers would return to the farm except for false pride, created by the dishonest city. This would be a prominent theme on farm migration in the latter part of the century.

¹⁷ Some small changes in area occur. The data were taken from *The Maine Register*, 1802.

¹⁸ These crops and others are discussed in Smith, "Towards a Theory of Maine History," in Johnson, ed., *Explorations in Maine History*, pp. 45-64. For the role of these matters in the founding of the University of Maine, see David C. Smith, *The First Century: A History of the University of Maine at Orono* (Orono, Me.: University of Maine Press at Orono, 1979).

¹⁹ For a description of the source materials and methodology used to construct table 3, consult David C. Smith and Anne E. Bridges, "The Brighton Market: Feeding Boston in the Nineteenth Century," *Agricultural History* 56 (January, 1982): 3-22.

²⁰ These remarks are based on a detailed reading of Maine newspapers from 1820 to 1900. Newspapers carried weekly reports on the market. One study of the Maine industry exists, Eugene Graves, "A History of Maine's Nineteenth Century Beef Industry" (M.A. thesis, University of Maine at Orono, 1967). Specific newspaper articles that

deal with more than numbers include *Maine Farmer*, Feb. 28, Aug. 22, 1834; Feb. 19, Dec. 30, 1836; Jan. 30, Feb. 6, 1838 (This last is an annual report of the Kennebec Agricultural Society. It deals with Brighton, weather cycles, growing root crops, and the failure of wheat as a cash crop.); Oct. 23, 30, 1845; Aug. 16, 1849 (railroad impact); Dec. 12, 1850 (Maine railroads). *Farmer and Artizan*, Aug., Sept., Nov., 1852; Jan., 1853; *Aroostook Valley Sunrise*, Oct. 18, 25, Nov. 1, 1867; Aug. 7, Oct. 2, 1868; *Franklin Register*, Nov. 14, 1840, Nov. 20, 1841 (on Quebec as a market); *Farmington Chronicle*, Aug. 14, 1845; Jan. 2, 1873; Jan. 7, Sept. 2, 1875; *Portland Eastern Argus*, Sept. 23, 1884 (long letter on state of droving business).

The preceding article and those that follow were delivered before the annual meeting of the Organization of Maine Historians, held at Augusta on May 2, 1981. The authors are as follows:

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