Cunning Observation: US Agricultural Statistics in the Time of Laissez-Faire

Emmanuel Didier

When the agricultural market began to expand nationally during the nineteenth century in the United States, it gave rise to its evil twin: speculation. As early as 1863, the Lincoln administration, through its newly born Department of Agriculture, decided to intervene against that ill effect. The antidote that it developed was a statistical measurement of the nation's agricultural production copied from the Prussian example (USDA 1863, 576).[1] Its publication was intended to prevent the circulation of false or misleading reports produced by speculators whose primary interest was to control and manipulate prices (Estabrook 1915). In so doing, the administration rendered the task of speculators much more complicated because they did, of course, continue to manipulate demand (which depended mainly on them), but stage-managing supply became much more difficult. To counter market distortions, the administration realized that *objectivity* was a most effective weapon. In what was generally considered a laissez-faire economy, it turned out that the federal government played a crucial role, and a political one, in producing public objectivity to fight against what we would today call an asymmetry of information.

This essay was supported by the French National Agency for Research, project number ANR-09–SSOC-054–01. I first drafted this paper in French; Priya Vari Sen translated my draft into English, and what is presented here is a substantially modified version of the translation.

1. The Prussian agricultural statistics were thoroughly described by Max Weber (Pollak 1986).

History of Political Economy 44 (annual suppl.) DOI 10.1215/00182702-1631770

But how were those agricultural statistics generated? The task was all the more difficult, as the area covered was vast and varied: a single standard for tropical Florida and snow-covered Montana, separated by thousands of miles, was impractical, especially to comply with the same rule to produce data. The overall translation, several times a year, of the diversity of American agriculture into statistical data aggregated to the national level created many problems.

This essay describes the new method of observation that was developed between 1890 and 1930, epitomized in 1914 when the US Department of Agriculture (USDA) organized for the first time a network of full-time civil service statistical agents, one in every state, to perform this task (Taylor and Taylor 1952, 231).[2] It was the time when statistical expertise took shape in the department. The essay proposes to explain how these new statisticians, professionals, yes, but human beings nonetheless who, like all human beings, brought their own idiosyncrasies to the task, aggregated their local observations into data about an entire state and even about the United States "as a whole," to use a formula that appeared at the time. And we will insist on the fact that, aside from the virtues of temperance, patience, and precision, which are often associated with good scientific observation, a certain amount of cunning intelligence, less frequently pointed out, was also essential to the task.

We know, as Lorraine Daston (2010) has so brilliantly shown, that observation creates time. Thus it is not surprising that it also creates space. Indeed, to quantify the agriculture of the entire nation, statisticians had to express—in a statistical sense—what "agricultural America" meant. The things and geographic areas the statistician was supposed to gather data on were far from given.[3] We will thus explore here what the concrete task of transforming local observations of agriculture into figures expressing agricultural America as a whole consisted of.

To begin with, an agency had to be created to take charge of personnel and operations. Today this institution is called the National Agricultural Statistical Service, but it is difficult to say what it was called then, as it

2. Prior to this date, the federal government relied on marshals, tax assessors, and representatives of the state's agricultural departments. The hiring of federal agents in 1914 aimed at avoiding the biases provoked by these interviewers. In the small East Coast states, a single statistician (see footnote 3 for an explanation of the capital *S*) was assigned to several states.

3. For example, the list of crops that fit into their inquiry was not clear-cut and changed during the twentieth century (for a discussion about the interest of quantifying pickles, see Didier 2007). In addition, the status of subsistence farming was initially not clear: give than its products remained on the farm and did not enter the market, should it be counted?

changed names frequently. In 1917 it was the Bureau of Crop Estimates; in 1921 it became the Division of Crop Estimates; in 1922 it was renamed the Division of Markets and Crop Estimates; toward the end of the period covered here, it was called the Division of Crop and Livestock Estimates (Taylor and Taylor 1952). In view of this litany of titles, for the purpose of the present essay, I will call it "the "division," because during the period under scrutiny it remained mainly a division of the USDA. The statistics discussed below were created by the division.

When I opened the division archives, I found a massive jumble of documents—dozens of cartons, in-house notes, letters, drafts, questionnaires, lists of names, pay slips, rulers, tables of numbers, soil samples, mathematical formulas.[4] The most striking characteristic of this mountain of archives was its diversity. How were items so different in nature combined to constitute a single and unique entity, an agricultural statistic? One of the lessons of childhood is the impossibility of comparing apples and oranges. But the administrative machinery responsible for these calculations was composed not only of apples and oranges but also of thousands of other ingredients. As paradoxical as it may seem, the creation of homogenous numbers (e.g., the overall quantity of wheat produced by the United States at a given date) boiled down to amalgamating a multitude of perfectly heterogeneous elements. How is it possible to change heterogeneity into homogeneity?

To understand this operation, we will start from the time when everything constituted a challenge for statistics, and we will advance step by step toward the construction of the final figure. In this way, we discover concretely, on a human scale, as it were, the observational methods of the agricultural statisticians in the time of laissez-faire.

The Plasma

To understand the process by which the statisticians in our story finally managed to generate numerical figures, it helps to ask when that first began: at what point did a statistical act take place? When the statisticians learned the theory of statistics at school? When during breakfast they reflected on unsolved problems encountered the day before? When they took up their pens to do the first calculations? All these answers have

4. The division as a government institution had the immense advantage of having its archives preserved in the American National Archives, Washington, DC, Record Group 83. Hereafter cited as RG 83.

some justification and are of some interest. To avoid a long discussion I will peremptorily impose, as in fiction, the stage at which for us statistics began. This stage I call *plasma*.

This term comes from the Greek verb *plassō*, which originally designated Prometheus's task of sculpting man and Hephaestus's act of creating Pandora with wet clay (Cassin 1995). The linguistic root of *plasma* is thus a verb whose meaning denotes "modeling." Substantively, plasma is the raw material that the person modeling, shaping, has in hand—which makes the activity of conformation possible. It is something that has its own specific characteristics, but insofar as it presents itself for shaping and modifying. Plasma is what was available to our statisticians when they wanted to initiate something but had not yet started.

The plasma is thus something open to human manipulation; apart from the statisticians in our story, others manipulated it too, but the manipulation that it underwent at the hands of those others was not statistics. Thus a sheet of paper is produced by diverse artisans and skilled laborers—from the woodcutter to the papermaker—and has its own specific characteristics (it is perhaps white or cream, A4 or US Letter in size, etc.), but as long as the question of printing a questionnaire on it does not arise, the sheet is still plasma. It ceases to be plasma once it becomes part of a statistical project. The plasma was the entire panoply of elements available to the division or to one of its representatives when it (or they) decided to transform those elements into statistics. It was the elements that interested the division because it suspected that the elements would have been interesting when transformed into statistics, although no one had bothered to transform them into statistics before.

Aside from plasma, there were already statistical elements. Prior practices left former routines, tools, mathematical formulas, and so forth that already belonged to the statistical realm. But when a survey was launched, it necessarily responded to something that had escaped those initial elements (otherwise the survey would have been pointless). It is this unknown—but interesting—element that I call plasma.

Reporters

In the winter of 1913, after having worked in the regional meteorology offices of the Department of Agriculture, Verne H. Church was hired by the division as one of the first statisticians and was put in charge of Michigan. Excited by this new challenge, he immediately set out to explore the countryside, seeking direct contact with the area under his charge. This is how the plasma appeared to this novice:

> In keeping with my instructions, I then shut my office and left for one week's excursion in the country. My apprenticeship was both painful and disappointing. Thanks to the directories and a personal survey, I located the grain, fruit and vegetable marketers. I found that some were cooperative while others were not. Most criticized statistical results and methods. Because of my lack of experience and sketchy knowledge of the subject, I did not have the results in my head and very few in my brief case. I found that the greater part of the criticism was levelled against State statistics, which at that time I didn't know much about. Those who were satisfied with the reports published by the State thought that the federal invasion of the countryside was a waste of effort and expenditure. . . . The first few weeks of roaming around was the only period during which I had regrets about leaving the meteorological service. (Church 1943, 213–14)[5]

The initial experience of the statistician was disappointing—he left full of enthusiasm, but met mostly unhelpful interlocutors. His role was to produce statistics, but statistics did not appear to be popular among farmers. The way out of this embarrassing situation was a list, a simple list of names, first standardized and regularly kept in the 1910s. Indeed, rather than weaken the morale of its agents, the division began to retain the names of those interlocutors who, once they understood the purpose of the questionnaires, agreed to fill them out regularly. All that was needed was to convince some farmers just once of the utility of the approach. Recruitment was never easy: "Making long lists of addresses was quite difficult and progress slow" (Church 1943, 9). But occasionally it succeeded. Thus each time a survey was initiated, the division posted a questionnaire to each farmer listed, always the same ones, and asked them to complete and send it within the given time. These interlocutors the division called *voluntary crop reporters*, because they were like agricultural information volunteers.

As these reporters were a rare commodity, the division turned them into loyal allies and tried to forge as lasting a link as possible with them. It used to send them, for example, *Crops and Markets*, a monthly report

5. Church 1943 is an unpublished autobiography of a statistician from the Department of Agriculture. It was very kindly made available to me by his descendant Gregg Wager.

of the survey results. It also sent them guidelines for filling out the questionnaires and for using the published figures, and even Christmas greetings at the end of each year. In short, the division made efforts to remain in close and enduring contact with its sympathetic interlocutors.

But was any person who was willing to cooperate a suitable person? It seems that two additional directives guided the choice of reporters. First, the division tried to have them well scattered over the entire territory. The objective was more or less achieved, as in 1926, for example, the list contained no less than forty thousand names (USDA 1933, 4), which greatly exceeded the number of rural townships.

Second, the farmers who agreed to become reporters seemed to have been intellectually superior to the others. Indeed, unlike the representative surveys of today, the reporters' task was not to share their feelings or their experiences but to inform the division about the state of agriculture in the entire neighborhood. They had to conduct a personal investigation, observe neighboring agriculture, and not be influenced by their personal results (which could differ from those of others); only after this work had been accomplished did they send a memorandum to the division on the growth condition of the crops. Thanks to their own inspection of the neighborhood and to their public spirit, reporters were able to discover the truth of local production, and they were "known for their intelligence and their discernment" (USDA 1933, 186).

The questions asked were based on a simple principle of estimation that had been established during the nineteenth century. As the goal was to estimate the total production of different cereals in volume, the division asked informants to evaluate two variables per cereal: the area cultivated and the yield per acre. Area was expressed in acres (and thus statisticians called this variable "crop acreage"), and yield was termed "condition of growth" (informants were asked what the plants' conditions of growth had been during the period surveyed). The multiplication of one by the other gave the volume of production.

These two estimates were requested in the form of a percentage of variation compared with a norm. In fact, with the help of a certain number of studies that the division claimed to have conducted on people in general, it had come to the conclusion that it was difficult to estimate absolute values, whereas it was easier to estimate percentages (Becker 1928). For example, when it asked for an estimate of the number of acres under wheat cultivation, the reporter tended to give a somewhat inaccurate answer, whereas if it asked for a comparison with, say, past observations, the response was much more precise. So, with reference to a specific crop, the division asked the reporters to compare the area under cultivation in the current year with the previous one. A similar detour was done with the condition of growth. The division then simply had to translate these percentages of variation into an absolute value (which was done with reference to the decennial census) and then multiply the area by the yield to obtain an estimate of production (for details, see Didier 2007).

Thus these two indicators resulted from the composition of a great number of elements extracted from the plasma: the lists containing the names of the reporters; the "theory" according to which they were better able to estimate percentages than absolute values; the mountains of letters on the basis of which the division tried to establish a relationship of trust with them; and so forth. Before the survey all these elements were separated; they were not necessarily linked. The act of surveying consisted in establishing the list of reporters, dispatching questionnaires to them, and writing out and transmitting the instructions; the reporters conducted their own inquiry and translated their observations into figures. The statisticians identified these elements, reorganized them, and reconstituted them into the one little number recorded by the reporters in the box intended for this purpose. The number contained and summarized this multitude statistically, and thus gave a texture—still unfinished—to what the United States would become at the end of the process. At this stage, however, it was itself only a minuscule element, only valid for a ridiculously small area. Let us now see the fate reserved for these first components.

Touring on the Job

The task of the statistician was to prepare reports on the agriculture of his state based on data that the reporters had communicated to him. But reports were not his sole and unique source of information. He also accumulated intimate knowledge of his territory. This personal knowledge helped him interpret and study the percentages passed on by the reporters in the most constructive way possible. Hence the initial processing of the questionnaires, paradoxically, consisted of setting them aside while he went out to survey the land directly. As I have already shown through Verne H. Church's example, accumulating detailed observations of the terrain was not easy. Let us review some of the additional difficulties that the statistician encountered and see how he resolved them.

First and foremost, observation necessitated great mobility, and in fact, it appears that this was one of the profession's chief attractions. Church (1943, 5) explains that the most attractive characteristic he saw in the profession of statistician before he was hired was that it "would take [him] out of his office" and on "to the field."

However, these trips posed a thousand difficulties. The first was that the means of transport were often nonexistent in the 1910s. "To interview farmers and inspect crops, it was necessary to use horse and automobile liveries for trips into the country. Because the cost of this type of transportation was usually based on distance and time, interviews had to be brief, and the return trip often made over the same route as the outgoing one" (19).

The statisticians wanted to increase their mobility, like sales representatives, and get an automobile of their own. They asked the division to supply one, but it was much too expensive. Finally, in 1921, they got the right to be reimbursed for the use of their own automobiles at work (222).

The second constraint, related to the first, was the administrative boundaries, which further complicated the statistician's task. Emerson M. Brooks (1977, 29), the statistician of Kentucky in the 1920s, explains that "the topography and shape of the State were not conducive to efficient operations as it stretched 700 miles from east to west, but averaged less than a third of that north and south. The road system radiated out from Louisville with few intersticing roads, making cross state travel a round about, time-consuming, jaunt."

Hence even if the statistician had a car, the physical shape of the state further complicated his movements. And this on top of the fact that local roads and highways were far from being surfaced and suffered from mud holes and ruts created by the wheels on horse-drawn carts and the like. In addition, it was not until 1926 that the federal system of numbering highways was formally adopted—before which maps were rare and often reduced to simple route books that were extremely misleading (Akerman 1993, 81). All these difficulties, however, make it possible to understand how the surveys should ideally proceed: the statistician should do long interviews and travel easily over many roads to inspect different crops.

To reach this goal, statisticians benefited from a series of resources, the first of which was a districting of the territory. In the 1910s the division had obtained from the Post Office Department (as it was then known) a map of its "postal routes" and had transformed them into "crop reporting districts" into which the states "had been divided on the basis of agricultural and geographical homogeneity" (Brooks 1977, 13). (See figure 1.)

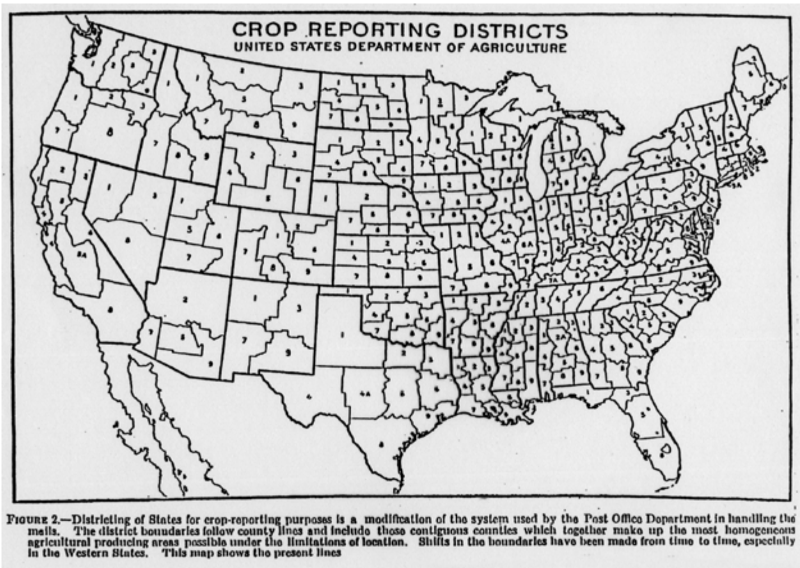

Figure 1 Map of the crop reporting districts (USDA 1933, 28)

The division of a territory into crop reporting districts was made with gathering agricultural statistics in mind. Its advantage was that, as each district was homogenous, any information pertaining to a given crop was valid for the entire district.

Apart from the divisions, another crucial resource was what statisticians called "Area Confabs." Let Church (1943, 215) remind us of their first occurrence sometime between 1917 and 1920: "Bryant, Cochran and I immediately agreed that we could meet together occasionally near the common boundary of our three states, not only to collect information at that point, but to exchange ideas and experiences concerning the work and the problems involved."

Brooks (1977, 215) explains that this experience "inaugurated the practice of Area Confabs where Stats in adjoining or nearby states, get together once a year or so at a convenient time and place to mull over their difficulties, check on the 'grapevine' and get better acquainted." For the statisticians the area confab was thus an opportunity to share their experiences and synthesize their methods. It was an opportunity given to officials to reflect on the matters at hand.

Lastly, equipped with all these resources, the statistician directly questioned the farmers he had managed to identify as right for the questionnaire. These interactions were generally quite friendly, but could also turn out to be incredibly complex. Here is an example narrated by Church, about a survey on the quantity of potatoes to be put on the market. It was a difficult exercise, for it involved a cash crop, that is, a product grown to bring some hard cash to farmers (as opposed, e.g., to corn for feeding pigs) and therefore susceptible to market prices: "Most farmers felt the estimates influenced the market prices, which made them reluctant to give unbiased information" (Church 1943, 223). Despite the difficulty, Church went, as usual, to Greenville, the capital of Montcalm County, where he had discovered a farmers' cooperative and three wholesalers, of whom the most important was Sam Metzger. Church describes his interaction with Metzger:

> While he pretended to be co-operative in supplying information to me, his talk was mostly generalities about the potato situation and the big things he was doing in a business way. The real information I was seeking, he carefully concealed, or it was suspiciously unreliable. I always called on him merely to satisfy his egotism and minimize his criticism of our estimates, although I obtained my best information from the other Greenville dealers. (223)

Church and Metzger thus found themselves in a complex situation where they talked to each other each time they met, but to lie all the better both indulged in half-truths and manipulation. Church knew that Metzger "concealed" pertinent information, but listened to him nevertheless, not for what he said but to defuse in advance his interlocutor's criticism (insofar as the latter had participated in producing the final figure, he could not say that it was bogus, unless he confessed that he had lied). Inversely, Metzger cooperated because he knew that if he did not meet Church, he had no way to influence the numbers that the latter would produce. For the statistician, learning about agriculture required mastery as much of manipulation as of agronomy.

Building a personal observation of a state's agricultural situation required that the statistician master a series of resources: means of transportation, physical geography, communication abilities. With these resources, he could build a second point of view on state agriculture, apart from that of the reporters and of their method of reporting. He was now ready to compare his own observations with those of the reporters.

Editing

Exhausted by his travels, the statistician finally returned to his office. His first task was to sort out the questionnaires that had piled up in his absence. To preserve hundreds of loose sheets without letting disorder and its correlate, error, reign was not a trivial task. He secured them in ordinary envelopes in which he could separate the questionnaires on the various ongoing surveys (one for wheat, one for corn, one for pigs, etc.).

Once the date for the fact-gathering phase had passed, the task of processing the questionnaires could commence. He opened the envelopes and systematically discovered that . . . many of the reporters had made obvious mistakes. What could he do about these errors? Editing helped repair the damage.

In some cases, editing was carried out directly on the questionnaire to correct the most obvious mistakes made by the reporters. A typical error was to confuse the boxes meant for cattle with the ones for grains (heads of cattle were not written down as a percentage but counted) and consequently to record figures much greater than one hundred in those boxes where, normally, this was impossible. When the error was identifiable, editing consisted of transferring the information to the appropriate boxes.

In other cases, editing involved eliminating some questionnaires from the calculations. There was apparently initially no general rule about editing, but only individual practices. Leslie Carl, at the time the Iowa statistician, explained, for example, with respect to a survey of March 1932 on falling land prices, that he edited (i.e., eliminated) the questionnaires where the variations in the price of land in one year as compared with the price of land in another exceeded 35 percent. Carl did not offer a justification for choosing this limit, but he decided to disregard the questionnaires that exceeded it, probably for being too extreme. This operation enabled him to "bring into line" the results obtained that year with those of the previous year. The decrease, which became 19 percent after the editing, was comparable, on the one hand, with the 15.6 percent obtained from the "paired reports," that is, with the reports of the reporters who had replied in two consecutive years and which the statistician had collated two by two, and on the other, with the aggregated results of the previous year. The figure obtained after editing was thus "aligned" with the earlier results.[6] Editing thus had the advantage of rendering a

6. "Comments on Crop Reports," Iowa report, March 1, 1932, RG 83.

survey compatible with the totality of the results already produced, among which it came to take its place.

There was also one enormous drawback. Selectively eliminating questionnaires implied lack of faith in the authenticity of the information provided by the reporters who had filled them out. However, as the latter were in fact the division's principal informers, it seemed highly paradoxical to disqualify them. On what logical basis did the statisticians choose to doubt the data from year's faithful informers rather than the data from the preceding year? The answer is straightforward: when the different sets of data were contradictory, it was necessary to exclude the weakest ones, which might be the reporters' answer. "In our editing out of extreme reports, it is possible to rely on first hand knowledge of local conditions. Extreme reports which other information does not substantiate, are brought into line or rejected. We do not feel warranted in accepting extreme reports which first hand knowledge of local conditions would discount."[7]

The statistician did not always go by his own gut feeling though, preferring sometimes to give priority to the assessments made by the reporters when they differed from his. C. J. West, the Ohio statistician in 1923, gives us an example of this type of dilemma during one of his surveys. He says that, according to his own travel observations of the number of breeding sows kept on a farm, he could have increased the answers of the reporters slightly compared with the preceding year. But here he felt that his own judgment had to give way to the "average recorded by the Reporters," which was the same as the previous year. The reason, he explained, was that, according to a general rule he had formulated, a sort of raw social theory he had constructed, farmers tend carry on as in the previous year when they are short on enthusiasm. Being pessimistic, they tend not to be innovative and repeat their decisions of the preceding year. Now, according to him, the reporters seemed that year to have effectively shown little enthusiasm. As a result, West recommended that this theory and the reporters' responses be given priority over his own observations.

Thus, contrary to what one might imagine, the statistical work performed by the division's statisticians was not governed solely by mechanical rules and procedures. Editing, which was an essential step, was one example of this. In fact, the data were nearly always self-contradictory. As

7. Entry 83, "Comments on Crop Reports," Leslie Carl's letter to W. Callander, May 27, 1932, RG 83.

a result, the statistician had no other option but to do a personal nonstandardized evaluation aimed at tallying the data as best he could. This evaluation consisted of asking which data could be eliminated and, after that, of reorganizing the remainder into a *coherent* whole, one that contained the *maximum number of elements*. To try to include more agricultural data (personal knowledge accumulated by the statistician, some theories on the farmers, etc.), Leslie Carl, like C. J. West, first sought to incorporate contradictory data in such a way as to sacrifice as little as possible. Editing was thus a delicate operation that *had to be carried out* (mutually exclusive information could not be retained), but it deprived the statistician of all his anchor points (all sources of information could be called into question). Hence it was left to the sole *discretion* of the statistician.

Adding

Once edited, the questionnaires were ready for the task of calculating the average. There is nothing more mechanical than an average: all it requires is to add all the observations and then divide the total by their number. Everyone knows this. But in practice is it that easy? Has the reader ever taken a hundred loose sheets of paper (approximately the number of questionnaires that the statistician received from each agricultural district), select just one of the several columns, and add the numbers that it contained without ever repeating or forgetting any entry? Although the formula may be simple, accurately computing a hundred questionnaires is far from foolproof.

Hence an ingenious mechanism was developed in the beginning of the 1920s that resolved the difficulties: "The schedules were sorted by crop-reporting districts and 'shingled,' one district at a time, without reference to counties within the districts. . . . A blank schedule was placed at the bottom on which the number of reports, sums and averages for each item were entered" (Church 1943, 6).

Prior to totaling the entries and calculating the average, the questionnaires for each district had to be *physically* rearranged. *Shingling* meant that the statistician had to take all the questionnaires of one district and make them overlap each other, just like roof tiles, so that only the numbers were visible. After the last questionnaire, he added a blank one, then he used a long wooden ruler—the peg strip—which resembled a skirt-peg wire hanger (except that it was more than a meter in length), that tightly clipped together the entire lot of questionnaires (see fig. 2). The calculations

Figure 2 The peg strip in use in 1960. Photograph courtesy of National Agricultural Statistical Service–USDA, Rich Allen's archives

could thus be done directly, without having to copy the reports and without the risk of forgetting some or counting them twice. The totals and the number of reporters were directly noted in the boxes of the blank questionnaire found at the end of the lot.

A further complication could arise when statisticians wanted to "weight" the sample, that is, give more importance to some observations than to others. This could be worthwhile, for example, when the townships in one reporter's district were larger than those in another. In this case, the statistician did not divide the sum by the number of questionnaires but by a set of weights. Once again, this meant that he had to decide which ones to choose, and why.

Hence initially every individual questionnaire was related to the neighborhood of the reporter who had filled it out, but through the shingling method, the integrated and reorganized schedules now constituted together the district on which the average bore. Thanks to this special concrete organization of questionnaires, the total was a new element extracted from the plasma that characterized the district. Thus, little by little, the state's elements were starting to "take." Editing had helped collate certain elements, and shingling had completed the process and produced districts. State by state, the United States was also in the process of taking concrete shape. But there was still work to be done before consolidating it for good.

Smoothing

Once the averages had been calculated, the statisticians noticed that sometimes, even in neighboring districts, the averages varied considerably, so much so that at times the variation did not seem plausible. To resolve this problem, the statisticians carried out an operation called smoothing, which required a geographic base map.

On the map, only the district or county boundaries were shown. Inside each of them, the statistician noted the corresponding average. This step thus highlighted the distribution of the growth condition—if we take this variable as an example—in the subelements of the state. He could now see how the growth condition had evolved when he looked from left to right or from top to bottom. If he observed excessive differences between neighboring districts, he could minimize them, which is to say, "smooth" them. This procedure rested on the principle that if two neighboring districts had very different results, it was possible that the difference was the result of an error that needed to be corrected. On the map of Kansas (fig. 3), we can see that the statistician has circled an odd-shaped zone that is consistent in itself (wheat had reached close to 70 percent of its maturity), but not with the zones surrounding it (where it was closer to 90 percent). The statistician had to decide whether to "smooth" this peculiar variation or leave it as it was. But then he had to provide an explanation.

During the smoothing process, the state in its entirety began to emerge. But it is remarkable that this step, which is a kind of generalization, was *not* an induction, that is, the whole inferred from its parts. It used elements from the totality (the form of the state) as well as from the localities (the values ascribed to the counties), and even certain other factors that fit inside each other like the famous nesting Russian dolls (the principle according to which one had to be wary of marked variations). On the contrary, the totality was used to calculate local values, as much as local values helped construct the totality. The emergence of the state was an add-on and an overlapping of the extra elements and not an induction. It is in this way that the observation of the United States was consolidated much more than it was induced.

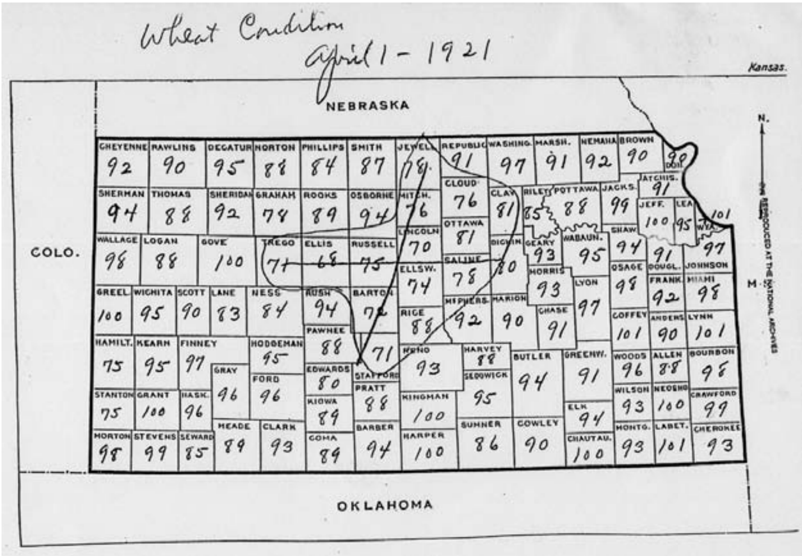

Figure 3 Smoothing carried out on the growth condition of wheat in Kansas in April 1921. The statistician has highlighted the central depression by circling it (US National Archives, RG 83).

Sending the Results

Once the percentages had been smoothed out, they were reported on a "summary sheet" that contained all the thousand and one elements extracted from the plasma by the reporters and the statistician (the administrative boundaries, trust between a person and an institution, a car, discussions between colleagues, letters, skirt-peg hangers, base maps, etc.) once they had been edited, totaled, smoothed out, weighted, and organized. It was itself an element in the general tallying process, incorporating all the partial elements and all the meticulous operations that could, finally, be sent to the central office in Washington, DC.

But first the summary sheet was transformed into a new document, which contained only the principal results and was immediately dispatched by telegram. These results were telegraphed to ensure that they reached Washington, DC, rapidly. They were, moreover, coded: each number from 1 to 120 (for the percentages) was replaced by a common name, which ensured the confidentiality of the data, which, at this stage, attracted the interest of potential speculators.

And after sending the figures to Washington, the statistician had to write "comments on crop reports," whose purpose was to mention all the elements mobilized during the processing of the answers. During the 1930s the list of elements was not standardized, so that each statistician chose to mention the ones he considered most important. I have already mentioned Leslie Carl, the statistician from Iowa, who referred to the series of older statistics, and C. J. West, the statistician from Ohio, who conceived a social theory about the relation between the enthusiasm of reporters and their observations. These reports were relevant precisely because each statistician had the advantage of being completely independent.

The statisticians thus produced three types of documents: a coded telegram that contained only extremely condensed numbers, a summary sheet that gave an exhaustive synopsis of all the results, and detailed remarks on the various stages of production of the first two documents. Between them, the three documents recapitulated the agriculture of the state. They condensed and aggregated the masses of reports sent by the reporters, discussed and rationalized them when they contradicted each other, and presented the statistician's personal observations and some earlier statistics. These three modules took different routes (telegraph and the ordinary post), but they left for the same destination—Washington, DC—the heart of the division where the statistics of the different states would be compared.

The story of how the state figures were gathered in Washington to produce exhaustive counts for the United States as a whole is as long—if not longer—as the one that I have just told. Many more surprising steps were necessary. So I will simply refer the reader to other sources where this description is made (Didier 2005, 2009) and call on his or her confidence: after a great number of successive transformations, agricultural statisticians had indeed calculated an estimated production of this or that crop for "the US as a whole." They were able to produce an observation of the entire nation.

Conclusion: The Cunning Intelligence of Observation

We can now conclude that observation appears first and foremost as a process of aggregation. It consists in identifying diverse elements in the world and amalgamating them into a new element, which might itself be aggregated with other elements to produce another observation. In our account, the reporters gathered data about acreage and condition of growth and used them to fill out their reports. statisticians listed those reporters, collected their answers, and aggregated them to their personal observations of the field. The division gathered bits of information about agriculture in the diverse states of the American union and synthesized them into a set of national figures. At every step of the process, heterogeneous elements were put together to form a new one.

The heterogeneity of these elements is striking. Expert statisticians made alliances with lay reporters; quantitative data were combined with qualitative ones; lists were used to identify singular events; outdoor trips informed indoor clerical tasks; material tools produced abstract figures. Many opposites were reunited in the observation. All the same, the ways these elements were associated seemed infinite and imaginative—contrary to the image of the statistician as a highly boring bureaucrat. statisticians wrote letters to the farmers who had completed the questionnaire to maintain a constructive relationship with them—but did not rely *too* much on the good graces of the farmers—and mastered agronomy as well as the manipulation of data: they established stable district boundaries; they invented machines that clipped questionnaires together; and so forth.

So the final question that we are led to ask is whether there is an actual common point between these diverse ways to observe. I propose to answer positively with the word *mètis*, which also comes from the ancient Greeks and can be described as *cunning intelligence* (Detienne and Vernant 1991), an intelligence made of detours, of tricks. Statistical observation also has its own *mètis*. It consists of finding cunning ways to associate heterogeneous elements.

Finally, this series of aggregating steps never ended. I concluded my account by referring to another paper, which tells the story of the Washington, DC, continuation of the process that I have illuminated here. Observations always come from previous observations and might always be reaggregated into some other one. And so are my own observations aggregated in this essay.

References

Akerman, James R. 1993. "Selling Maps, Selling Highways: Rand McNally's 'Blazed Trails' Program." *Imago Mundi* 45:77–89.

Becker, Joseph A. 1928. "Analysis of Assumptions Underlying the Various Indications of Change in Crop Acreage." In *Class of the Division*, March 9, Washington, D.C.

Brooks, E. M. 1977. *As We Recall: The Growth of Agricultural Estimates, 1933–1961.* Washington, D.C.: USDA.

Cassin, Barbara. 1995. *L'effet sophistique*. Paris: Gallimard.

Church, Vern H. 1943. *Personal Recollection of the Government Crop Reporting Service*. Personal printing by Huwon Productions.

Daston, Lorraine. 2010. "Observation as a Way of Life: Time, Attention, Allegory." Hans Rausing Lecture, Uppsala University.

Detienne, Marcel, and Jean-Pierre Vernant. 1991. *Cunning Intelligence in Greek Culture and Society.* Translated by Janet Lloyd. Chicago: University of Chicago Press.

Didier, Emmanuel. 2005. "Releasing Market Statistics." In *Making Things Public: Atmospheres of Democracy*, edited by Bruno Latour and Peter Weibel, 638–42. Cambridge: MIT Press.

———. 2007. "Do Statistics 'Perform' the Economy?" In *Do Economists Make Markets? On the Performativity of Economics*, edited by Donald MacKenzie, Fabian Muniesa, and Lucia Siu, 276–310. Princeton: Princeton University Press.

———. 2009. *En quoi consiste l'Amérique?* Paris: La Découverte.

Estabrook, Leon M. 1915. *Government Crop Reports: Their Value, Scope, and Preparation*. Washington, D.C.: U.S. Government Printing Office.

Pollak, Michael. 1986. "Un texte dans son contexte: L'enquête de Max Weber sur les ouvriers agricoles." *Actes de la recherche en science sociale* 65:69–75.

Taylor, Henry C., and Ann D. Taylor. 1952. *The Story of Agricultural Economics in the US, 1840–1932*. Ames: Iowa State College Press.

US Department of Agriculture (USDA). 1863. *Annual Report*. Washington, D.C.: USDA.

———. 1933. *The Crop and Livestock Reporting Service in the United States*. Washington, D.C.: USDA.