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Seeking Parts, Looking for Wholes

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Prologue

For much of the twentieth century, observation and measurement have been deeply intertwined in the practices of economics. Ask an economist what "an observation" is and, until recently, the answer would have been "a statistical data point."[1] Ask an economist about problems of observation, and he will think about ones of measurement.[2] During the twentieth century, these two conflations came to seem so natural to economists, that the commentator has quite some difficulty separating them out again. The ability to do so relies on the fact that scientific observation involves not just processes of observing but ones of recording and reporting these observations. Alignment is required between the acts of observing and those of recording (and for both of course with other broader elements in the epistemology and ontology of a field). The necessity of such alignment may be one way to understand why, in empirical branches of economics, there is such a close colligation between *observation* and *measurement*: for economists, measuring creates or constitutes the alignment between *observing* and *reporting*.

The nature of the relation between act of observation and mode of reporting may, in turn, reinforce certain characteristics in the observer and on the observation process. In certain sites of observation, such as building history, observers share an ethos that it is the process of recording itself that opens the eyes to recognize particularities in the case observed. Such observers record their observations by carefully drawing every brick and stone and every last feature of them (such as the Berlin Wall) and then transcribing certain elements that indicate historical changes onto time/space charts.[3] Here, the

initial act of recording is one in which the recording hand enforces the eyes to see things that they might otherwise neglect if they looked using other, more passive, recording media (for example, in this building history context, photographs). For twentieth-century economists observing the economy as a whole, the ethos is different, but equally particular: processes of recording must be ones that ensure not just numerical accuracy with respect to all the individual parts, but completeness with respect to capturing the whole. In contrast to the archaeological case, much of such recording is carried out independently and at long distance, as for example, when firms fill in forms about their activities for tax purposes that are then used by those in statistical bureaus to abstract particular entries as "observations" for economists. The link between the observing economist and the numerical recording is therefore reversed; rather than the economist's observation preceding recording, recording takes place in the statistical bureaus and precedes the economist's observation, and is often quite remote from it.[4]

Yet the disciplinary aims of numerical accuracy and completeness still work to link observer and a network of many separate recorders. Whereas the numerical accuracy largely depends on those making the initial recordings of the initial pieces, completeness largely depends on the skill of the economist in locating those many different recordings and fitting them together. Whereas earlier, economists had been active gatherers of data themselves, these statistical bureaus or economic observatories established in the later nineteenth and early twentieth centuries (some commercial and others public) largely took away from the economists the need to observe and record observations themselves.[5]

This essay focuses on a time when economists were adopting a new set of concepts for the economy as a whole, and on a place where economists wanted to use those concepts to measure an economy as a whole but found very few numbers already available and no fully functioning observatories. In consequence, they were forced to visit and look into those economies in order to see them firsthand. To observe "the economy" as a whole, they needed to measure its parts, but, as we shall find, in order to measure its parts, they had to find ways to see them. In looking for them, and from looking at them, they hoped to record their observations in a particular form, namely, in numbers that fitted their particular conceptual framework—though they did not always succeed. This episode provides the materials to probe the easy conflation of "observations" with "measurements" in twentieth-century economics, and to suggest what might be special about the nature of observation in the social sciences.

Observing a Whole Economy

The project of observing, or measuring, the economy as a whole arose in a new form in the later 1930s and 1940s with the development of national income accounting (NIA) systems of measurement associated in the United States with Simon Kuznets and in the United Kingdom with Richard Stone.[6] Their ambition was not just to measure the whole, but to do so in ways that would reveal hidden internal structures of the economy as suggested by the new concepts of macroeconomics. Their problem of observing the economy can be seen as similar to that of mapping a country: we cannot easily observe the country as a whole, for the problems of scale and size with respect to the human observer mean we can only see a little bit of it at a time, and we have difficulty even getting a perspective on that bit. Yet the analogy captures the idea that once we have made a map, we gain the sense that we can see not only the country as a whole, but its main surface features such as rivers and mountains as well—though of course, what we see is the record of the outcome of that process of observation. So, observing an economy is a bit like an exercise in cartography, where we are mapping economic rather than physical space and observing and recording the economic society at the same time.[7]

There is at least one very important difference: the small bits of the economic society that can be observed separately do not fit naturally next to each other as they might do in mapping. This makes it more like doing a jigsaw puzzle, but a very difficult one because we do not have the set of pieces, we do not have "the picture to go on" (that is, to guide choices about how to put them together), we do not even know the dimensions of the whole, let alone its shape, and there are no recognizable edge pieces to help us. The individual elements have to be defined, observed, recorded in numbers, labeled, and categorized before they can be fitted together in a way that makes sense This might seem a hopeless task, akin to the redactive and synthesizing task of making "a general observation" on the state of disease in the nation of eighteenth-century France that we find in J. Andrew Mendelsohn's essay in this volume. But twentieth-century economists held an advantage, for their jigsaw of economic numbers had to fit into an overall conceptual framework designed to ensure that the complete economy is covered. Only then could the economist "observe" a numerical picture of the economy as a whole and, more importantly, see something of its hidden internal relationships. Or, following our earlier analogy, it is as if, having mapped the surface of an economy by recording each little bit at a time and finding out how they can be fitted together, economists expect to reveal something of

its internal and underlying, that is, its geological, structure. Somewhat more whimsically but no less daunting, in the early 1950s, the terrain was pictured as "a vast chessboard" on which could be laid out, one on each square, the people, resources, and economic claims of a nation's economy: "Our celestial economist [like Laplace's supreme mathematician with respect to the physical world] might, as time unfolded, picture to himself a succession of such giant chess boards."[8]

Neither the identity of the parts nor the aggregation of these economic accounts was self-evident. These original scholars, Kuznets and Stone, had devised the concepts and techniques of national income accounting (NIA) for their own "advanced" economies. And they doubted that one set of rules and definitions would enable them to measure all economies in the same way. Kuznets had argued for the particularity of each country in each historical time period and thus thought that comparison over space and time was not likely to be viable using NIA.[9] While economies might have certain features in common, categorizing the variations would be more important than observing the commonalities. And it was because of the differences they *perceived* in economic and social arrangements that economists involved in the initial development of NIA understood the project as a method for bringing the economy into observation. That is, while the accounting framework helped one to see an economy, it was not originally understood as a standardizing instrument that also enabled comparison between countries, because the concepts did not necessarily fit all economies in the same way and so their measurements would not be comparable.[10] Thus, following Stone's publication of his NIA approach in 1941 (with James Meade), the question immediately arose: were they "universally applicable," that is, could they be applied to "primitive" economies?[11]

To answer this question, "an experiment" began in the early 1940s to see whether the system could be applied to the British colonies, and the economist Phyllis Deane was hired to conduct this "test" by constructing national income accounts for two areas of Central Africa and Jamaica.[12] It is the African countries that concern us here. Following an interim report based on research carried out during wartime London (published 1948), she carried out field visits to Africa in 1946–1947 before her longer report (published 1953).[13] She then acted as a member of the advisory committee overseeing a similar project begun in 1950 to construct national income accounts for the Nigerian economy, which forms the second case study for this essay. This was a team project of two economists and a statistician: Alan Prest visited that economy twice, working with Ian Stewart, who spent a whole year in the field, and Godfrey Lardner of the Nigerian Secretariat in Nigeria.[14] Stone—now widely

regarded as the father of national income accounting—was actively engaged on the advisory committee of both these colonial projects, along with his partner in this NIA work and at home, Feodora Stone.[15]

Looking Secondhand, Finding Numbers

The NIA system, as constructed by Stone and his collaborators, provided three things for the observing economist. First of all, it provided a framework for organizing a picture of the economy, one that not only brought the elements of the economy into range, but also created a form of perspective so that the economist could make sense of the whole, and did so in a way that ordered its elements and provided a means to understand their relationships. In fact, the accounts created three different ways of seeing the economy at once: the *income*, *output*, and *expenditure* perspectives, or as Deane promised in her first report of 1948, the NIA "provides a three-dimensional picture of the national economy."[16] These three alternative ways that economists visualize the economy provide theoretical or conceptual perspectives.

Second, national income accounting involved a new form of complete economic census that was supposed to measure the "aggregates" by counting separately and independently all the flows of incomes, products, and expenditures (in monetary terms) for each of these perspectival columns for the whole economy. We can see something of the task in table 1 from Deane's first report (fig. 12.1).[17] The aggregate *income* was recorded in column 1, made up from the income obtained by the different groups of actors in the economy: total wages earned by workers, profits gained by capital holders, rent gained by landlords, and so forth (the traditional economic categories). Column 2 recorded the aggregate *product* or *output* again within traditional

THE LOGIC OF THE FUNDAMENTAL TABLES

TABLE 1. The simplest case of the income-output-expenditure table

I	II	III
Net national income	Net national output	Net national expenditure
1. Rents	7. Net output of agriculture	14. Expenditure on goods and services for current consumption
2. Profits	8. Net output of mining	
3. Interest	9. Net output of manufacture	15. Net investment
4. Salaries	10. Net output of distribution	
5. Wages	11. Net output of transport	
	12. Net output of other services	
6. Total net national income	13. Total net national output	16. Total net national expenditure

FIGURE 12.1. From Phyllis Deane, *The Measurement of Colonial National Incomes: An Experiment*, National Institute of Economic and Social Research, Occasional Papers, 12 (Cambridge: Cambridge University Press, 1948), 9. Reprinted with the permission of Cambridge University Press.

categories, namely, agriculture, manufacturing, and services. Finally, it embodied the new Keynesian conceptual categories of *expenditure* in column 3: aggregate consumption, aggregate investment, etc. These columns—once constructed—could be manipulated to reveal the behavioral mechanisms thought to make the aggregates change over time, or they could be subdivided in other finer-grained ways to reveal different hidden structural features of the economy. As Deane wrote in 1953, the economic policymaker

> wants to be able to see each of the constituent items in the network of national economic activity not only as a separate feature of the national accounts, but also as a factor influencing and influenced by other activities. . . . A colony which has processed its economic data by producing a system of social accounts has marked out the chief outlines of its economy and made it possible to observe the structural content and changes therein as a connected picture, even though the uncertainty of some of the outlines may leave parts of the picture rather blurred.[18]

Since the framework was an accounting one, in principle, these three aggregates of *incomes*, *products*, and *expenditures* displayed in the columns should "balance"—that is, be equal to each other: a triple-entry economic bookkeeping.

Third, the accounting system came with a manual of instructions that contained the definitions of the bits or elements to be observed and recorded and told the economist how to treat them, that is, how to adjust them (if necessary), and how to categorize them into the various aggregate columns and boxes. So the manual is a field guide enabling the economist to recognize and classify the various incomes, outputs, and expenditures that they observe themselves or that have been recorded by others, while simultaneously providing a set of regulations for their treatment as measurements to ensure that the overall tables balance. As Meade and Stone suggested, their 1941 paper provided such a manual, but not an exhaustive one; there was still much work to be done by any economist applying the accounting:

> [A]n outline has been given of the main problems of definition which must be solved in order to ensure that the tables balance. There are, however, a thousand and one small problems of definition which arise in attempting to measure the individual items in the different tables.[19]

Since NIA had been invented to fit Western economies, the problems of application to those economies was to a considerable extent covered in the accounting framework and rule book.

For Deane, based in London during the war, looking at these African economies secondhand, it seemed at least worth trying (thus the terminology

of "experiment") to construct national income numbers for them. She gathered together all the available reported data on her target economics from many different sources—however narrow in focus, however fragmentary, and however out-of-date.

Yet there were still a "thousand and one small problems of definition" to solve before observations could be recorded in the correct boxes within the NIA. Which activities counted as output? What was the difference between cultivating land and collecting wild food that should make one an economic activity (something was produced) and the other not? The convention she used was where a tangible good was produced, the activity counted: growing crops counted but collecting firewood did not! There were many problems about where to draw lines for recording purposes: around production for the market, or around all production that created goods? around a country or around its nationals? among others. This was desk work of meticulous accounting, of classifying and fitting together unruly numbers, not the speculative observation of economists' "armchair work" we see in Harro Maas's essay in this volume. And while this secondhand mode of looking from the desk was not an easy way to observe a whole economy, Deane nevertheless concluded that these new concepts of NIA based on "Western," "developed," or "advanced" economic experience might be adapted to illuminate the African economies.

The complete accounting system was designed to provide a discipline to ensure that each and every part of the economy was recorded and fitted into the framework somewhere, and not counted more than once. The demarcation criteria were critical for categorizing activities in order that at least some kinds of measurements could be recorded for each of the columns. In principle, the total measurement for the national economy should be the same from each of the three perspectives: they should all three end up "in balance." And, since each column was built up from "independent and distinct calculations" and the data were "differently derived and differently classified," the different columns would operate as a checking system to make sure complete coverage was gained.[20]

Unfortunately, this balancing check did not quite work out as expected. The two most obvious difficulties were, first, that Western concepts of NIA excluded goods and services produced and used only within the household, and, second, that economic activity consisted only of activities that lead to exchanges for money. Of course, in the context of Western economies, these two assumptions went along together, for typically goods and services produced and used within the household were not marked by monetary exchanges between household members.[21] Deane was quite aware that economies of Cen-

tral Africa she was studying experienced considerable economic activity that would not be counted in NIA either because it was inside the household or was traded, bartered, or gifted without monetary exchange. Yet she also believed that these economies were not pure subsistence economies: they were economies in which most people's activities were mostly nonmonetized, but most people had some monetary income and some monetary transactions. In such economies, column 1, incomes, was not a good measure of economic well-being, which was better measured by column 2, outputs, provided that monetary values could be assigned to them. Thus, Deane essentially carried out double-, rather than triple-entry bookkeeping, collapsing—for practical rather than theoretical reasons—incomes and outputs (or production) into one column and having a second column of "consumption" (rather than "expenditures") because of the low level of monetized exchange.

Another independent set of checking came by using other "observers" to triangulate the evidence. So Deane's first attempt at constructing the national income accounts out of "secondhand" materials was sent out for comment to "a few informed observers," that is, observers in Britain and Central Africa who had firsthand experience of that region.[22] They were then revised and published in her 1948 preliminary report. Meanwhile, in 1946–1947, she had been out looking in the field: visiting copper mines, doing survey work in villages, and burrowing through the census office.

Looking Firsthand in the Field, Seeing Fog

In Deane's second report of 1953, after visiting Africa and observing some of her economies firsthand, we find a change in tone. She admitted that in such economies as those she was trying to measure, national income accounts were not such as to enable the investigator to see sharp lines and clear elements, but rather "a few large shapes in a thick fog." In her view, the problem lay not in

> the margin of error arising from inadequate statistical data that hinders most the application of national income estimates to practical policy purposes, it is the fog that surrounds the concepts themselves.[23]

Whereas in her first report the problem had seemed to be how to fit the secondhand recordings of observations made by others into the NIA concepts, here the difficulty was how to fit NIA concepts to the economy that she saw herself.

Deane argued that there is always a problem of the fit of economists' concepts to the activity they wish to observe and so measure, for such concepts

tend to be "vague at the fringes." In a developed economy where most economic transactions are market transactions, the ones that don't quite fit the conceptual definitions are either excluded by definitional conventions (e.g., gifts) or because they are believed relatively small (e.g., barter). When those awkward nonmarket transactions at the edge of Western economic consciousness are the main activities in the African economy, the problem of observation using the definitions to guide the observer manifestly changes: "What is the fringe in one society, however, is not necessarily the fringe in another."[24] While this did not necessarily invalidate the overall NIA project, it did cause her huge difficulties in applying the conceptual apparatus within the framework for observing and recording the economic structure within her African economies.

The main problems in taking the NIA to Africa as a framework for observation and recording measurements continued to be the assumption that Deane had struggled with—namely, that nonmonetized exchanges and exchanges within the household were excluded. This lead to some startling paradoxes in the African context. For example, in a salient example that runs through this literature, a marriage payment in money might be included in the accounts of transactions because it was monetized, but the value of nearly all the staple food produced might not because it was not exchanged for money—precisely the opposite of what the "Western" national income investigator would want to count.[25] For such economists, the use of money to indicate an economic activity did not provide a valid account of the values of incomes, products, or expenditures, and where it was used, there were doubts about its role as a viable measuring stick of those activities.

Nevertheless, Deane still regarded this lack of conceptual fit as one of degree rather than intrinsic. She argued that the NIA concepts never fit exactly to any Western economy either, and that the problem might be considered equally to lie in the eyes of the beholder, the Western economist in Africa, for whom

> logical compromises . . . have to be made in practice. . . . based on an inadequate background of sociological data and are therefore more arbitrary than they would be for an investigator for whom the community's accepted ends of economic and social policy are part of his native background.[26]

Note the benefit here that Deane suggests comes from the close knowledge and engagement of a "native background," not a professionally distant and scientific knowledge, for in the social sciences, background knowledge is experiential knowledge that comes from living in a community rather than acquired by scientific means.[27] Close-up experience was necessary to make

sensible observations and recordings, that is, to see through the considerable fog to make classification decisions.

In Deane's perception, the economies she studied were overwhelmingly "village economies," a type of economy that was semisubsistence, and for which the NIA concepts were not just ill designed but frankly "alien" yet must somehow be adapted to the task.[28] Her firsthand experience of the village economy came in visiting three areas in what was then Northern Rhodesia (now Zambia) a territory of 290,000 square miles, with a sample census count of 1.7 million people in 1950 (there had never been a full census), twenty-one different ecological/agricultural systems, and over fifty different tribes. In April–May 1947, with the help of a group of locals, anthropologists, and other expatriates, she undertook what she describes as her second "experiment" (following the first "experiment" of conducting secondhand observation in London), namely, to understand the "village economy" by observing it firsthand with the help of a survey questionnaire. The local anthropologists helped her in choosing "typical" villages, in designing the survey, and in introducing her to the villages. She clearly enjoyed working with the anthropologists and commented favorably on the

> enlarged viewpoint and the stimulus which can be gained from seeing one's data through the eyes of other observers while they are actively being collected and analysed, are advantages which an economist can give as well as receive.[29]

But, being a member of a different tribe from the anthropologists—for economists, recall, observation entailed measurement—Deane naturally sought to record numbers from her survey observations. As she said, while the qualitative data (whether people eat eggs or milk, or whether "little girls of more than six years of age regularly pound maize") provide "the flesh and the form," the quantitative material is "the skeleton" without which the qualitative data would be a "shapeless affair."[30]

The main difficulty in her survey work lay in defining, or perhaps finding, households, the base unit in the NIA within which (recall) exchanges were not counted. Here we find Deane grappling with the answers to her survey questions to turn her observations about the household into something typical that might be recorded in quantified form. For example, listen to this stream of observational statements about the village economy:

> Theoretically, a man made a hut, a garden and a granary for each wife and a garden and granary for himself. In practice, his newest wife probably shared a granary with him and worked on his field. She might even share a granary with another wife. More frequently, household equipment, such as a mor-

> tar and pounder, was shared, although there was usually a fairly definite understanding about the actual rights of ownership, Where a man earned a money income from his garden or as wages there was no recognized share for each household. He allocated it as he chose. Where a woman earned income through sale of produce or beer brewing the money was hers to be spent on her household. Sometimes two or more wives would combine households in preparing the day's meals. Hence, in practice the accounts of the six households in a polygamous group were usually so intermixed that for most purposes it was convenient to collect the data and present the accounts together.[31]

If the economic relations between husband and wives were complex, the economic lives of young bachelors and children were even more difficult to observe, let alone to describe. Recording the household's economic activity depended upon being able to categorize its observed behavior, but it proved almost impossible to pin down the household even as an observational unit:

> If one travels round the village on a person to person basis and asks each woman how many unmarried children she has she would include in her answer young children living with their grandmother, perhaps in another village. . . . If one travels on a hut to hut basis and asks each woman how many children she has sleeping in her hut the answer will include such children as those who habitually eat with their grandmother and others who are, say, the children of migrant brother.

How could she even define, let alone research, a household when her fieldwork observations told her:

> The principal difficulty in surveying was that the sleeping household, the eating household, the income household, the producing household, and the spending household all represented different combinations and permutations within one wide family group.

Whereas of course, for the economist,

> the ideal household for accounting purposes is the group of persons eating and sleeping under one roof and pooling their income.[32]

Observing the village economy made Deane deeply aware of the problems of applying NIA concepts to the African village economy. The household could not be well defined as a recording unit, and not even seen in one place at one time as an observable unit.

It was not just that the concepts did not fit the economy, but the incredible variety of economic experiences, both within villages and between those of different districts, made labeling, categorizing, and otherwise organizing her observations extremely difficult. Her observations just refused to fit easily into either her own background experience or her economic concepts. At

the same time, the absence of the universal measuring stick of money made it difficult to quantify the things she did observe in her survey work into a coherent picture.

> It is doubtful whether it would ever be possible to define income so that it meant the same thing to the African villager and the European town dweller, or to the African in his subsistence habitat and the same African in temporary urban employment.[33]

Deane thus concluded that the problem of applying the NIA framework to the village economy, the semisubsistence economy, was not entirely a data problem but more of a conceptual problem, one that she had looked at in her London work but that she did not really see until her fieldwork made her more deeply aware that

> it is not clear what light, if any, is thrown on subsistence economies by a science which seems to regard the use of money and specialization of labour as axiomatic.[34]

Deane had underlined the limitations of theoretical concepts/categories of NIA and found that they don't enable you to see very far when you visit other kinds of economies for which they were not devised. She saw the problems as practical ones about how to draw lines between the things observed in order to place them into the already formed NIA categories, and since many of the village observations neither fitted those boxes nor could be recorded into quantified form, her survey work did not enable her to fill in much more of the jigsaw puzzle of the whole economy in the social accounts. Nor did the clash between conceptual and observable categories that Deane experienced from her direct observation of the economy lead her to a new set of conceptual definitions that would have enabled her to turn her observations into usable measurements. Indeed, her comment on her experience in the field seems to betoken a radical skepticism about economics.[35] Nevertheless, Deane's pioneering work formed something of a model for later scholars such as Prest, Stewart, and Lardner (PSL), and in turn, their development of the NIA equally proved a model for later workers in the field.[36]

Seeing with New Categories

Lardner, Prest, and Stewart, like Deane, gave an account of their attempts to record the Nigerian economy that fairly bristles with firsthand observational experience. And like Deane, they came to the conclusion that the overall concepts of "Western" (their label) national income accounting did not fit

Nigeria: the main field guide distinctions between categories could not be made in the field because the observer could not recognize and separate economic activities. The distinctions between production and use, between production and consumption, between production and distribution, between production in manufacturing and in agriculture, or between income, wages, and profits, could not be made in practical terms. Another problem they noticed lay in the lack of standardized and precise measures, in particular, the use of handy consumer items (such as the tin containers in which cigarettes were sold—the "cigarette cup") as measuring units. So neither "Western" concepts nor recognized standardized measurements were viable in Nigeria.

Where Deane, when looking from her desk in Britain, had created different categories within the perspective of incomes in her column 1, and her practical solution has been to collapse that column into the outputs column 2, PSL's move in the field was far more radical. Western economy guidelines were based on the market activity of the household, drawing a circle around it so as not to count the economic transactions within that circle. We have seen how problematic this was for Deane's observations and her recordings in the field, where most economic activity seemed to take place within the household, not beyond it, and how she had struggled in her fieldwork to pin down and record exactly what a household consisted of in order to value subsistence production. PSL's solution was to change one of the fundamental definitions in the field guide, namely, to move the boundary of what was to be counted inward and to draw a smaller circle:

> The contrast of our treatment with the "Western" one is that of drawing the ring round the individual as opposed to drawing it round the family.[37]

This tight circle enabled them to capture in their observations, and so to count, all economic transactions between individuals within the household group as economic activity for the NIA.

PSL's redefinition was both conceptually cleaner and more practical than Deane's solution, for it enabled them to make use of monetary transactions wherever they occurred. This included, infamously, making use of the bride payment as payment for all the services that a wife produced for her husband—not just gardening, farming, and cooking, but also childbearing and -rearing.[38] Their argument was not only consistent with the wider NIA requirement to count all economic activity, but also was based on their field observations, for the relationships between husband and wife were in many ways more commercialized than those in Western economies:

> [M]any cases have been known of wives suing husbands for debt; women's earnings from trade cannot be touched by husbands; food provided from

> women's own cultivation for the general use of the family is often on a loan basis and delicacies such as pastries are only provided for cash. . . . Altogether, it seems reasonable to argue that commercial transactions exist inside the family as well as outside it.[39]

It is paradoxical that it was the new concepts and measuring structures of the NIA that prompted economists such as PSL to recover in Africa the original Greek notion of economics as the activities of the household. Yet it is surely more deeply ironic—as Prest and Stewart noted—that the exchange relations they observed within the household in such "primitive" economies were far more monetized and so economically advanced or "rational" (according to the notions of twentieth-century economics) than those apparently rather primitive households, with a more gendered division of labor and power over money, of the "developed" or Western countries where these new concepts of NIA had been developed.

While finding bride prices was relatively easy, finding monetary valuations for other exchanges and outputs that would enable them to construct the NIA was often more difficult. Here they were more conservative and refused to rely on too much imagination to construct those missing numbers:

> Where goods and services are not marketed it is possible to go as far as asking what they might be worth if they were. To take the further step of inventing functional relationships such as demand and supply curves, or even appearing to invent such relationships, seems to us unwarranted in a country where consumption and production activities are inextricably mixed and where enterprises and households may often be synonymous. Further complications also result from the shadowy and ill-defined nature of many economic units. . . . Where complex economic transactions do not exist, little purpose is served by making them appear to do so.[40]

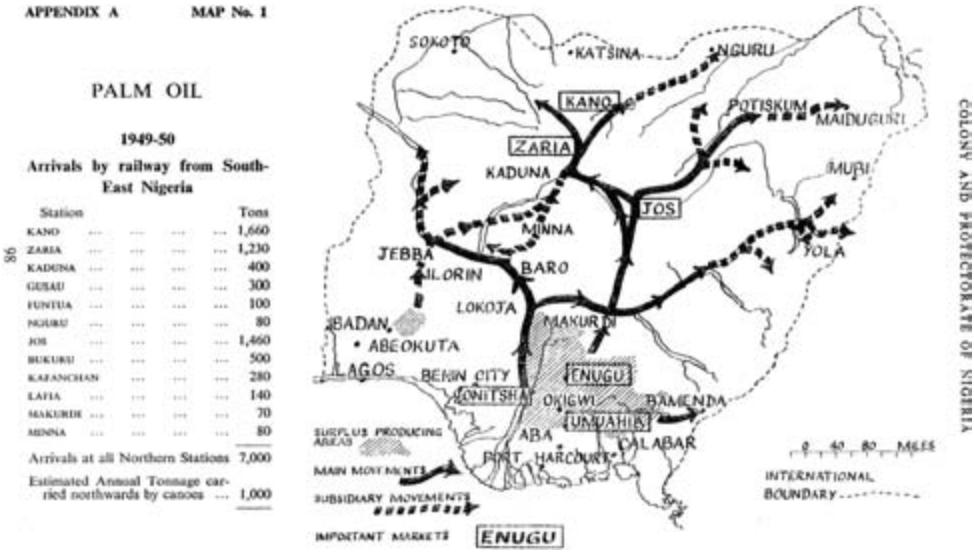
Whereas Deane had been unable to construct a separate production account from her London desk because so much of the village economy was not market-based or exchanged beyond the household, in the field PSL concentrated on the output column of the NIA and produced a figure of £597 million, which matched almost exactly their total expenditure column. In constructing the income column, however, they found a massive shortfall of 83 percent compared to those other totals. This was a direct outcome of their changing the definitions within the NIA, for their output account now included measurements for the intrahousehold production, which was of course substantial. And expanding the elements of economy brought under observation by including household production opened up another vast area of economic activity previously overlooked, namely, internal trading:

> There is no clear distinction between subsistence and trading activity. Rather, the two are inextricably bound together. . . . There is no tribe or group of villages which can be unequivocably labelled as subsistence producers only; much the most common situation is that of people and areas consuming part and selling part of their output either for internal use or for export.[41]

PSL's success in tracking the internal market, both in size and movements, brought another aspect of the economy into economic observation as can be seen in their commodity maps of internal trade (or "vulture's eye views," as they called them!), which even revealed a vibrant trade in some previously unreported commodities or unreported directions (e.g., fig. 12.2).[42] On this new basis, it was hardly surprising that their calculations of the average Nigerian per capita income was much higher than expected since they were counting substantial household production and substantial internal trade, which had been omitted in previous attempts to estimate the well-being of the country. So, by changing the definitions of the subunits, they had not only filled in a much larger section of the jigsaw of measurements, which they knew had previously been left missing, but had—in effect—expanded the area covered by the framework itself into areas they had not known about.

Observing this expanded area of the internal market had presented other challenges and involved a network of other economic observers within Nigeria. Like all Western economic investigators/observers on such NIA missions, Prest and Stewart were reliant not just on local economists (Lardner) but also on teams of local noneconomists, not in an any economic observatory, but people in the field doing other things, such as district officers and local state civil servants, agronomists, professional social scientists (especially anthropologists), and perhaps even more important, those active participants in the economy such as workers and managers in firms and traders at marketing boards. They relied on all these people as so many observation posts. While secondhand field reports such as the official statistics of ports of entry of goods (which captured the international exchanges) were the kind of record that would reach the Colonial Office in London, these local observers provided many other local reports that never traveled to London—surveys of canoe trips (note the well-rounded estimate of canoe traffic in fig. 12.2), of records of ferry passengers and freights, of bridge crossing points, of railway records, and so forth.[43] The records of observations from these different kinds of local observers and field points of observation were taken in, interrogated, and reassembled first in an evidence triangulation to make PSL's maps of trade, but then to find their places as pieces of the jigsaw puzzle of measurements for NIA.

Observations travel in packs, as Daniela Bleichmar has shown in her ac-


APPENDIX A MAP No. 1

PALM OIL

1949-50

Arrivals by railway from South-East Nigeria

Station	Tons
KANO	1,660
ZARIA	1,230
KADUNA	400
GUSAU	300
FUNTUA	100
NGURU	80
JOS	1,460
BUKURU	500
KAFANCHAN	280
LAFIA	140
MAKURDI	70
MINNA	80
Arrivals at all Northern Stations	7,000
Estimated Annual Tonnage carried northwards by canoes	1,000

COLONY AND PROTECTORATE OF NIGERIA

FIGURE 12.2. From Alan R. Prest and Ian G. Stewart, *The National Income of Nigeria, 1950–51*, Colonial Office. Colonial Research Studies, 11 (London: HMSO, 1953), 98.

count of "botanical travels."[44] Each observation made in the field comes with a group of related ones, for in economics, the pack is made of different bits, and assembly is more important than parsing or dissection. These related bits are not mere context or detail to be discarded, but the other pieces of a jigsaw puzzle of economic relations must be fitted together in a set of economic accounts to make sense of the economic life of the smallest retailer as much as of the largest mine. This fitting–together accounting problem is on a grand scale in the NIA. It was one that Deane was familiar with from her own desk work, and that Wolfgang Stolper, who followed in PSL's footsteps a decade later, commented on several times:

> I find that I am happiest when I can work with figures, push a slide rule or a calculating machine and make endless details fit into a grand pattern.[45]

This grand pattern was the creation of consistency in the NIA. This was not a simple macroeconomic adding-up problem—it entailed complicated accounting calculations using the perspectival frameworks from economic theory to create consistent observations of the whole from the many individual parts. Stolper thought this a matter that required not only an understanding of the conceptual space of NIA and an expertise with numbers, but also the faculty of imagination:

> I work, for a theorist, with imagination—not intuition, but just imagination. I have the ability of being able to extract a maximum of information from scanty data, but this requires the painstaking study of detail.[46]

These cases, covering the work of Deane, both at her desk and in the field, and PSL, form just two examples of a process in which a generation of young economists went into the field to observe and record the national income of almost all non-Western economies in the 1950s and 1960s. The purposes may have differed—they might have been part of colonial, postcolonial, development, or aid missions. But by making such economies "visible" as separate economies, the NIA concepts and measurements became important elements in twentieth-century discourses way beyond those of academic economics.[47]

Observations on Economic Observation

Scientific observation has been associated by commentators from the history and philosophy of science to sit closely with two different kinds of epistemic genres. As we see from other histories of observation in this volume, on the one hand the observer is situated in relation to theory and experiment, while on the other the observer is situated in relation to classification/categorization and dissection/assembly. Observing with national income accounting, with its theoretical perspectival structure and its jigsaw task of categorizing and assembly, places these economists within both these genres. Both the theoretical perspectival requirements for looking, and the categorization requirements of seeing, were needed to turn observations into quantitative records and assemble them together. These activities of observation, in turn, involved qualities of perception, imagination, and engagement in the observer.

For these early national income accountants, the accounting system was designed to provide the frame of reference within which all the observed elements could be fitted together to provide three different perspectival accounts of an economy and do so in a way that revealed aspects of the hidden internal structures and relations of that economy, even the size and shape of that economy, for there were no natural boundaries and "the economy" was an amorphous and largely invisible object. But economists who tried to observe this difficult object by staying at their desks and by using the secondhand reports as the basis for their accounts had to use not just their skill and economic intuition, but their economic imagination as well, to fill in the gaps they found in the records. In using such secondhand observations, economists found themselves quite strongly bound by the theory or concepts

of the accounts—for remember it is the economist who must choose how to categorize the pieces of recorded data into the relevant boxes in the accounts. This created two pitfalls for the unwary economic imagination. One was the danger of imagining the behavior of the missing elements to make them fit exactly with the already given conceptual categories. The other was the danger of forcing the elements that have been observed to fit exactly to those existing conceptual categories because of the difficulty or inability to imagine new conceptual categories that would be more appropriate.

We can see that such dangers were recognized: both in PSL's refusal to imagine complex economic transactions where they did not exist, as well as in Deane's refusal to fill in the gaps that would fit secondhand reports to Western concepts. Yet both managed to steer an interesting middle path to create the alignment between theory and observation needed to make records of those observations. Stolper was willing to recognize the importance of imagination in order to fill in measurements for his missing observations, and, like Deane, was meticulous in working within the perspectival constraints provided by the national income concepts. Just as the Renaissance painters used the new linear perspective to constrain the representations offered by their imaginative recreations of history and myths to provide viewers with a sense of real-life observation, so economists used such tricks, or rules, of perspective given by national income accounting to line up their recorded observations of the real economic objects within the correct cells and columns.

Traveling to the site of observation turns the problems of imagination to those of perception. An economist who stays at home, like an artist of nature, avoids the cognitive dissonance involved in observing elements that don't fit your old experience but that you cannot quite fit into any new sense experience. Travel may broaden the mind, but the eyes may still take time to adjust. Europeans in Australia originally saw and painted landscapes with blue skies and brown earth containing trees with green leaves and brown trunks. Later generations came to see gray leaves and white trunks and burnt orange earth against purple skies. In a similar fashion, unfamiliarity gave way to new understanding for these economists who initially felt their task of observing the unfamiliar was quite akin to that of the anthropologists (who indeed helped them with their observations). They found the economic society they were studying so unfamiliar that they could not make full use of their experience of their own home economies to recognize and make sense of the economy of the countries they set out to observe and measure in terms that would fit the national income accounting framework.

Deane struggled to observe the Rhodesian village economy firsthand. These were struggles of perception: she looked from the viewpoint of her

own life experience in Britain's economy and found it difficult, for example, to see the economic life of the African household in such a different form. Prest and Stewart took a more definitive step in seeing in Nigeria the household economy as a set of individuals who make economic exchanges. Lardner's experience here was surely invaluable for his economic perception was as a Nigerian. Since both Deane and Prest were close to the center of development of NIA, and since it was still a project in development, they felt able, indeed, found it a necessity, to adapt the accounting definitions and rules to their own ends of colonial social accounting in the field.

I have separated out these issues of imagination and perception and related them to conceptual knowledge and background experience for an important reason. It is a familiar point that all observation is theory-laden, that we make observations and see things against a background of our theories. Here we have two different kinds of background knowledge against which economists make observations. One is the abstract, conceptual knowledge of economic science, against which observations are made and to which they must be compared for matters of fit, which I have associated with the quality of the imagination, but an imagination suitably bounded by the requirements of conceptual perspective. Equally important for observing in the social sciences is life experience, which I associate with perception, for in social sciences everyone has general knowledge from the experience of living in their own economy and society.[48] This personal knowledge from observation and experience is also a valid kind of knowledge that informs an economist's observation of another economy. Deane, for example, referred to the importance of the eyes of the beholder: eyes that see familiar things are valuable just because they see them against a background of similar life experience and so can make sensible judgments about them. This can be contrasted with the value of eyes that notice things just because those things are unfamiliar, as these Western economists surely did during their African fieldwork. Deane commented on both these issues of perception: whereas the former eyes may have problems seeing new things, the latter have problems making sense of what they observe. Perception, molded by the observations of life experiences, is an interesting double-edged sword. Both kinds of preknowledge—scientific and experienced—play a role in how economists observe. Together they form the backgrounds from which economic observers look out, and the knowledge base within which they see things.

Distance also matters—in looking and in seeing. Scientific observation using the NIA in these cases has been portrayed as both a busy set of activities of *close engagement with the subject*, while as the same time, conversely, one requiring the economist to *take an objective, distant stance*. The activity of

making economic observations from data, that is, from the secondhand reports of others, is an activity of sorting out the pieces, abstracting the relevant bits, categorizing them, and fitting elements together into their place in the pattern: it requires infinite patience and professional care. This all relies on a certain objectivity that comes from creating distance between the observer and the object. Objectivity here comes not from a professional stance of the social scientist but from the NIA, for it is that accounting framework that enforces the economist to place the seen objects into columns that will construct their three-dimensional perspectival account. But this focus on technologies of distance, while beguiling in many respects, seems to be equally balanced here by the virtues for the economist of close experience with the subject matter in ways that resonate with the histories of observation discussed in a number of other essays in this volume (especially in Elizabeth Lunbeck's essay on empathy, Otniel E. Dror's on observing emotions, and Theodore M. Porter's on Le Play's way of observing society).[49] It was this firsthand activity of observing that enabled the economists here to overcome the problems of fitting their economic concepts to economic life and to rethink those conceptual elements in order that the work of observing from their secondhand records might be more fruitful. While the accounting discipline created a consistency in overall perspective relevant for seeing the whole economy, here, just as in archaeological history where the recording hand enforces the eye to see, it was the firsthand, personal, looking in the field, that enabled economists to seek out, observe, and record those pieces that made up the whole.

Notes

1. Observation in economics requires multiple histories (as for other fields). Here it is understood as field- and desk work, using an accounting framework. Other histories suggest the following: a process of introspection, see John Neville Keynes, *The Scope and Method of Political Economy* (London: Macmillan, 1891); "armchair observation" (see Harro Maas, this volume); and as statistics, see Judy L. Klein and Mary S. Morgan, eds., *The Age of Economic Measurement*, annual supplement to *History of Political Economy*, vol. 33 (Durham: Duke University Press, 2001). The recent development of experimental economics may produce a new mode of observation in economics.

2. The classic example is Oskar Morgenstern, *On the Accuracy of Economic Observations* (Princeton: Princeton University Press, 1950).

3. I thank Johannes Cramer of the Technische Universität (TU), Berlin, for showing me hand-drawn recordings of the Berlin Wall, and Simona Valeriani for introducing me to these charts: "Harris Matrices," see Edward C. Harris: *Principles of Archaeological Stratigraphy*, 2nd ed. (London and New York: Academic Press, 1989).

4. Economists' experience may not be unusual: historians of science have long understood scientific observation as a process involving intermediating instruments, where observation

processes are carried out by technologies which also reverse the link between observing and recording compared to the practices of, say, the archaeologist.

5. Adolphe Quetelet had already linked modes of observing the planets and stars with those of man in the development of statistics, and we can think of the statistical bureaus of the twentieth century as sharing—for the social sciences—the same political overtones, mass projects of observation, and associated heavy requirements of calculation that have been taken as the hallmarks of nineteenth-century observatories: see David Aubin, Charlotte Bigg, and H. Otto Sibum, eds., *The Heavens on Earth: Observatory Techniques in the Nineteenth Century* (Durham: Duke University Press, 2010). The important point to note is that the form of measurement discussed in this chapter is not a statistical one, but an accounting one (even when the original bits of data come from statistical offices).

6. For Kuznets, see his "National Income," in *Encyclopaedia of the Social Sciences*, ed. Edwin R. A. Seligman, vol. 11 (New York: Macmillan, 1933), 205–44. For Stone, see James E. Meade and Richard Stone, "The Construction of Tables of National Income, Expenditure, Savings and Investment," *Economic Journal* 51 (1941): 216–33.

7. On earlier attempts to observe and record the economy as a whole, see, among a considerable literature: Sybilla Nikolow, "A. F. Crome's Measurements of the 'Strength of the State': Statistical Representations in Central Europe around 1800," (in Klein and Morgan, *Age of Economic Measurement*, 23–56) and the classic text, Paul Studenski, *The Income of Nations*, 2 vols. (New York: New York University Press, 1958).

8. Harold C. Edey and Alan T. Peacock, *National Income and Social Accounting* (London: Hutchinsons, 1954), 215 (bracketed phrase in the original), was one of the first practical manuals for economies where data were thin on the ground.

9. Kuznets, "National Income," 209.

10. Nevertheless, by the late 1940s, national income accounts had already become essential elements for various political actions: reconstruction aid (Marshall Plan aid, for example) required their calculation, for they not only provided a measure of general need but also identified specific needs.

11. The terminology quoted here and in the next paragraph comes from the opening pages of Phyllis Deane, *The Measurement of Colonial National Incomes: An Experiment*, National Institute of Economic and Social Research, Occasional Papers, 12 (Cambridge: Cambridge University Press, 1948).

12. Phyllis Deane studied economics during the late years of the Great Depression and went straight from her first degree into research, a move that would have been extraordinary for a female student but for the war years (see the interview with Phyllis Deane by Nicholas F. R. Crafts in *Reflections on the Cliometrics Revolution: Conversations with Economic Historians*, ed. John S. Lyons, Louis P. Cain, and Samuel H. Williamson [London: Routledge, 2008]).

13. See Deane, *Measurement*; and Phyllis Deane, *Colonial Social Accounting* (Cambridge: Cambridge University Press, 1953). The two areas of Central Africa she studied were then called Northern Rhodesia and Nyasaland.

14. I refer to the Prest, Stewart, and Lardner project in the text as PSL, though Lardner's name did not appear on the book. Alan R. Prest and Ian G. Stewart, *The National Income of Nigeria, 1950–51*, Colonial Office: Colonial Research Study, no. 11 (London: HMSO 1953).

15. Both these projects were overseen jointly by the Department of Applied Economics at the University of Cambridge (directed by Stone), the National Institute of Economic and Social Research (NIESR) in London, and the UK Government's Colonial Office. These intersections

go further: both Deane and Prest were members of the Cambridge University Department of Applied Economics, while Feodora Stone was also secretary of NIESR.

16. The terminology of "perspectives" draws on Bruno Latour's observation about the NIA in the context of his argument about immutable mobiles (see his "Visualization and Cognition: Thinking with Eyes and Hands," *Knowledge and Society* 6 [1986]: 1–40) but the sense is captured by Deane's own terminology here of a three-dimensional picture in *Measurement*, 8.

17. Deane, *Measurement*, 9.

18. Deane, *Colonial*, 3 and 8.

19. Meade and Stone, "Construction," 227.

20. Deane, *Measurement*, 8.

21. What this joint assumption might mean for NIA in developed economies was potentially substantial: Deane, *Measurement*, 19n reported figures for Sweden implying a 20–25 percent increase in national income if household activity was included. As we shall see, this was a much greater amount in Nigeria.

22. Both terms, Deane, *Measurement*, 4.

23. Deane, *Colonial*, 4.

24. Ibid., 116.

25. Ibid., 227.

26. Ibid., 128.

27. See Mary S. Morgan, "'Voice' and the Facts and Observations of Experience" (Working Papers on the Nature of Evidence: How Well Do 'Facts' Travel? 31/08 Department of Economic History, London School of Economics, http://www2.lse.ac.uk/economicHistory/pdf/FACTSPDF/HowWellDoFactsTravelWP.aspx), on the importance of this distinction for social science knowledge versus natural science.

28. Deane, *Colonial*, 130.

29. Ibid., 146.

30. Ibid., 119–20.

31. Ibid., 147–48.

32. Ibid., 148–49. Although she recorded some of the survey answers into quantitative form, she could not use them to improve the national income estimates.

33. Ibid., 227.

34. Ibid., 115–16.

35. Nevertheless, her radical skepticism did not stop her from later undertaking an even more heroic study to construct national accounts for the British economy going back to 1688!

36. These two projects prompted a number of similar studies in the 1950s and 1960s sponsored by the Colonial Office and the Colonial Economic Research Committee (part of an exit strategy from the colonies). Thus Peacock and Dosser, who constructed the NIA for Tanganyika (Alan T. Peacock and Douglas G. M. Dosser, *The National Income of Tanganyika, 1952–54*, Colonial Office: Colonial Research Study, 26 [London: HMSO 1958]), followed in paying tribute to Prest and Stewart. On PSL, see n. 14, above.

37. Prest and Stewart, *Nigeria*, 10.

38. Though the economic rationale seemed impeccable, it was of course, to Western economic eyes, somewhat shocking: they preferred to live with the paradox (attributed to Arthur Pigou) that measured national income should show a decline when a man married his housekeeper rather than to include exchange within the family.

39. Prest and Stewart, *Nigeria*, 10.

40. Ibid., 21.

41. Ibid., 9.

42. Ibid., 98–99.

43. Thus, for example, the insistence on fieldwork that Alan Peacock noted for the quality of NIA in colonial territories was highly dependent on accessing these local observers and their records (see Peacock and Dosser, *Tanganyika*, 3).

44. See the essay by Daniela Bleichmar in this volume, and at the meeting of the History of Scientific Observation group, Berlin, July 2007.

45. Clive S. Gray, ed., *Inside Independent Nigeria: Diaries of Wolfgang Stolper, 1960–62* (Aldershot: Ashgate, 2003), 141–42.Wolfgang Stolper, unpublished diary (available at the Duke Economists' Papers Project, Duke University Library), 121. Stolper worked in Nigeria in 1960–62, part of the time under Lardner: see Mary S. Morgan, "'On a Mission' with Mutable Mobiles," Working Papers on the Nature of Evidence: How Well Do 'Facts' Travel? 34/08, Department of Economic History, London School of Economics, 2008, http://www2.lse.ac.uk/economicHistory/pdf/FACTSPDF/HowWellDoFactsTravelWP.aspx.

46. Gray, *Inside Independent Nigeria*, 141–42.

47. See Daniel Speich, "Travelling with the GDP Through Early Development Economics' History," Working Paper on the Nature of Evidence: How Well Do 'Facts' Travel? 33/08, Department of Economic History, London School of Economics, 2008, http://www2.lse.ac.uk/economicHistory/pdf/FACTSPDF/HowWellDoFactsTravelWP.aspx; and Morgan, "On a Mission," for a more detailed sense of what this all amounts to.

48. See Morgan, "Voice."

49. On quantification as a technology of distance in the context of economic observation, see Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995).