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Conclusion: Platform Sociology

Marco Polo describes a bridge, stone by stone.

"But which is the stone that supports the bridge?" Kublai Khan asks.

"The bridge is not supported by one stone or another," Marco answers, "but by the line of the arch that they form."

Kublai Khan remains silent, reflecting. Then he adds: "Why do you speak to me of the stones? It is only the arch that matters to me."

Polo answers: "Without stones there is no arch."[1]

This book opened with a description of a visit to a tertiary care hospital. In the course of research for this book we visited many other institutions: universities, public and private research centers, biotech startups, established biomedical instrumentation companies, regulatory agencies, and other hospitals. The thread connecting these sites is, of course, the notion of a platform: these institutions lay along the path of our search for the components of a biomedical platform that established the nucleus of our description of medical routines and innovation.

The title and topic of this book came to us as a sort of epiphany. Following up on previous work on innovation in the field of immunology and antibody reagents,[2] we developed an interest in the scientific instruments that used those reagents and, in particular, in their role in the production, maintenance, and regulation of clinical and laboratory practices. Among these instruments, flow cytometry, often presented as a complementary tool for antibodies, but also as a bridge between biology and medicine,[3] seemed to offer an interesting case study. To take it as the focal point of our endeavor, so we thought, would provide us with a solid beginning, something tangible around which biomedical practitioners organized their activities. At one point, we even believed

that the instrument functioned as a "trading zone" between clinicians and researchers.[4] By following the instrument around, however, we were led in two different directions that seemed to absorb the object of our inquiry. The first was history: every part of the instrument offered yet another genealogy. The cytometer's lasers grew out of post-World War II military research strategies, its vibrating nozzle out of computer technologies, and the very idea of particle sizing went back to interwar Chicago pea-canning factories. The software for the instrument raised a whole new series of contexts and questions. Here, then, the instrument vanished into fragmenting genealogies. The second direction was practice: by following the instrument into its multiple uses (exobiology, radioactive fallout monitoring, cervical cancer screening, etc.), we came across zones of activity where the instrument competed with ongoing and similar practices that, ultimately, could not be defined by the use of the instrument; the instrument, in other words, disappeared into a multitude of practices. Our "materialist" strategy consequently lost its focus and its object.

Profiting from a sabbatical to mull over this conclusion in a nondescript Paris café, we reviewed the themes that had emerged in the course of our research on the instrument: the relationship of the normal and the pathological, the problem of standards, the transformation of clinical practices, and so on. Relating the themes to the instrument seemed forced and fruitless. Then, suddenly, a casual comment made a year or so before by the director of marketing of an American instrument manufacturer took on renewed meaning. We had visited the manufacturer's R&D complex in Florida to interview researchers who had worked on an early flow cytometer. Walking through the factory floor on our way to the interview, the marketing director suddenly gestured to the left saying, "That's where we make our platforms." At the time, we did not pay much attention to the remark, and we realized later, moreover, that neither of us had actually seen what the marketing director had been pointing to when he mentioned the company's platforms. Although we did not know it at the time, the marketing director had provided us with a key to the organization of our material: the idea that one could build something like a medical platform. We immediately knew we had something. We had seen bits and pieces of it over the years. The stories we had been following cohered, but it was not around the instrument, as we realized, but within the larger category used by the instrument manufacturer to describe his enterprise; he built platforms, not instruments. And, as we came to understand in the course of our discussion, from

his point of view he built two kinds of platform: medical platforms and research platforms. From our point of view, however, he participated in the construction (literally!) of biomedical platforms. We finally had our object of investigation, and this time it could not disappear; it was already invisible insofar as it was part practice and part object.

There is, of course, another way of describing what we have done. In the simplest terms, our book describes a biomedical innovation and the translation of that innovation into a variety of medical practices. We have, however, offered more than a case study in an attempt to break down the dichotomy presupposed in the previous sentence between innovation and translation. In addition to the case study, we have proposed a means of describing that case that brings together innovations and routine within a single *dispositif*,[5] namely a biomedical platform. We have done so by articulating two closely related themes: a historical one, the emergence of modern biomedicine; and a sociological one, the regulation of biomedical practices.

In this concluding chapter, we would like, first, to add a few theoretical and empirical specifications to our proposal and, second, revisit the main themes of the book and discuss how the notion of biomedical platforms elucidates our understanding of the development of biomedicine.

Platforms, Networks, Medical Technologies, Infrastructure, and Experimental Systems

The notion of platform was not snatched out of thin air. We have already noted (chapter 2) that it derives, in part, from "native" terminology in medicine and elsewhere. It is also connected to theoretical proposals developed by the growing number of historians and sociologists who study the development of the biomedical sciences. In what follows, we review some of these complementary and sometimes competing notions and confront the empirical limits of our study.

Although biomedical platforms coordinate action, they are not the only means of doing so. Social and technical networks are often instanced as a major form of coordination and their constitution and maintenance have become the centerpiece of scientific and medical innovation policy programs such as those sponsored by the European Union.[6] In a different guise, they are a key notion of the sociological approach known as "actor-network theory" that has been widely applied to the analysis of science, technology, and medicine.[7] In some respects, networks are a ubiquitous feature of the scientific world. In our

discussion of the CD system (chapter 6), for example, we examined the operations of a distinctive network of laboratories.[8] We can, however, distinguish networks from platforms. Insofar as they embody regulations and conventions of equivalence, exchange, and circulation (see chapters 8 and 9), platforms are not simply one among many forms of coordination that include networks; rather, they account for the generation of networks or, at the very least, they are a condition of possibility for the very existence and transformation of networks. The intermediaries that stabilize networks are produced and reproduced on the platform. Platforms supply networks with conventions, generate novel entities, and entrench them in clinical routines.

Much of the phenomena that we have described could be classified under the head of medical technology. Why not simply say that we have described yet another "medical technology" such as those examined in Stanley Reiser's seminal overview of clinical instruments and machines.[9] Although, as we will see, biomedical platforms are more than medical technology, there is no doubt that Reiser's book raised a number of themes that have since become standard and thus form something like a tradition. We have, however, already implicitly distanced ourselves from that tradition. It is generally held, for example, that medical technologies tend to remove the patient from the clinical picture and redirect the clinicians' attention from the bedside to the laboratory. In addition, it is maintained that medical technologies have downgraded or eliminated skills embodied in what is termed "clinical judgment," forcing diagnosing physicians to become increasingly subservient to technologies whose development they cannot control. The theme of technology overtaking medical practice also surfaces, in less normative terms, in Joel D. Howell's book on the turn-of-the-century introduction of diagnostic equipment and scientific management methods in U.S. hospitals.[10] As we have seen, whether it is deskilling, "objectification," or "fragmentation," none of these themes offer much to the understanding of the development of biomedical technologies or of the evolution of modern biomedicine. We thus feel that unlike the trope of "technology out of control," platforms have more to offer than the usual denunciations.

Similar limitations can be observed in approaches that take a more interactive view of the relation between technology and medicine. Consider, for example, Keith Wailoo's discussion of how medical technologies modified disease definitions (or, in trendier terms, disease "identities") in twentieth-century America.[11] Using hematology as a case

study, Wailoo purports to show how the technologies implicated in the development of the field participated in the construction and transformation of the various diseases (chlorosis, pernicious anemia, sickle cell anemia, leukemia, etc.), the patients that were the target of diagnostic and therapeutic interventions, and, finally, the very practitioners (e.g., oncologists vs. hematologists) who intervened. In turn, Wailoo claims, social, political, and cultural forces shaped these technologies in the sense that the latter acquired as much of their meaning and power from the cultural context of their use as from their use per se.

This is not the place to examine Wailoo's thesis in detail, except to note that his use of the term "technology" makes no difference between kinds of technology and therefore lacks analytical specificity.[12] As mentioned earlier (chapter 3), even medical reformers such as Lewis Thomas distinguished different *kinds* of technology. While the actors categories clearly cannot be taken at face value, they do, however, suggest that the technologies used in medicine are considerably more complex than Wailoo allows. At the very least, they suggest that there is no such thing as a "technology" that confronts "medicine" but, rather, many kinds of technologies that participate in different ways in the articulation of biology and medicine and thus in the establishment of new configurations of *biomedicine*. In other words, despite traditional usage, the notion of technology is too generic and, at the same time (even when stretched to include social and political actions and events) too narrow to capture the dynamics of biomedical innovation.

Describing the relevant divisions of this process in appropriate terms is a problem not only for historians and sociologists; it also preoccupies practitioners. Consider, for example, the notion of clinical research. The content of this category has generated a great deal of soul-searching on the part of U.S. biomedical practitioners and administrators. Numerous authors and institutions have proposed taxonomies of this activity, including such hybrid, finely tuned designations as "basic patient-oriented research" and "applied oriented research." Yet other contributors have redefined the entire field as a continuum without categorical distinctions.[13] While policy clearly inspires these classificatory endeavors, given the increasing complexity and diversity of biomedical practices the taxonomies necessarily call upon a variety of epistemological, material, and discursive traits of biomedical research for their formulation. Because of their static nature, however, taxonomic categories (rigid or porous) are ill-suited to capture complexity: dynamic notions are

needed, that is, notions that are able to account for processes rather than list traits.[14]

In this spirit, the authors in a recent collection of historical essays on twentieth-century medicine have coined the term "molecularizing" in an attempt to capture biomedicine's distinctiveness and dynamics.[15] The term does not, as one might assume, refer to molecular biology. Rather, it refers to the broader historical processes that led researchers and clinicians in biology and medicine to focus on molecules as the solution to their problems. From this point of view, molecular biology represents only the latest incarnation of a transformation with deeper historical roots insofar as molecularizing approaches were prominent in the interwar period. While we are sympathetic to this approach, we consider that, in the end, it fails for reasons quite similar to those mentioned for the medical technology tradition. Borrowing a useful distinction from French historical epistemology, one could say that "molecularizing" is a label, rather than a notion. As such, it merely isolates a set of practices and objects without showing what holds them together and qualifies them as a set. As such, it cannot be used as an analytical resource.

In addition to these historical approaches, researchers in the sociology of science have advanced a number of analytical categories that resemble platforms. Showing how our notion differs from theirs allows us one final series of theoretical specifications. Consider, first, Star and Ruhleder's notion of infrastructure, a sophisticated reworking of the notion of technology.[16] Embedded in material and discursive structures, infrastructures, according to Star and Ruhleder, become visible only upon breakdown (viz. normally, they are transparent). More than inert pieces of machinery, infrastructures incorporate heuristics and are learned as a part and sine qua non of membership in a collective activity, thus being shaped by and shaping conventions of practice. While, as we have seen, biomedical platforms incorporate the infrastructure necessary for the pursuit of biomedicine, they are not reducible to infrastructure. Moreover, although platforms contain infrastructural components, these components are visible. Unlike Star and Ruhleder's passive and transparent infrastructure, platforms are active, generative, and opaque. Indeed, we have seen that even though platforms extend beyond the walls of the clinical or diagnostic laboratory, they are more than technology or infrastructure. In fact, we have shown that biomedical platforms are neither science nor technology but a way of articulating the two. If a definition is needed, even at this late date, then we can

define them as the bench upon which conventions concerning the biological or normal are articulated with or connected to conventions concerning the medical or pathological. As such they define the standards according to which biomedical actions are evaluated.

Biomedical platforms may also be usefully contrasted with Joan Fujimura's notion of standardized packages, which she defines as a "theory-methods package" whose description shows "how tools, practices, and theories circulate through and across worlds of practice . . . and both change and are changed by their circulation."[17] In practice, Fujimura's application of her concept results in the recapitulation of the actors' narratives, insofar as it tells the story of how biomedical innovations (in her case, oncogene theory and related techniques) emerged from within a few elite biology laboratories and spread, as a prepackaged technique, to lower-level clinical laboratories.[18] In other words, Fujimura's theory-methods package, because it adheres so closely to the actors' accounts, becomes little more than a description of a linear process of innovation leading from the laboratory to the clinic. Such a narrative omits all mention of clinical work in the innovation process itself; the clinic and clinical research are represented as merely the endpoints of biology. In this sense, standardized packages do not so much "circulate" as "drive" the teleological accounts offered by participants.

Attentive readers will have noted that we have used the term "experimental system" several times in this book. We owe our use of the term to Hans-Jörg Rheinberger who has developed the notion in a series of books and articles.[19] Rheinberger's notion avoids the pitfall just mentioned insofar as it takes into account the fact that, for instance, an experimental system instituted for the study of cancer can easily become a system for the study of protein synthesis. In this sense, it crosses the biology-medicine divide. Similarly, it straddles the topic-resource divide and functions as an analytical category for both analysts and actors since, unlike Fujimura's notion of standardized packages, it is widely used by scientists to describe the problems they study and the techniques they use to study them. Defined in an admittedly compressed way as "a machine for the production of difference," the notion of an experimental system describes a fundamental unit of scientific activity.

Experimental systems also cross the science-technology divide. In particular, according to Rheinberger, the difference between science (epistemic things) and technology is generated within an experimental system. Thus, in the latter, as opposed to a technological system where differences are reduced to enable production of the same, the

reproduction of the same is subordinated to the production of differences. It will be noted that the previously criticized use of generic notions such as science and technology is here subordinated to and specified by a given experimental system: as such, it loses much of its indeterminacy and acquires analytical specificity. For our present purpose, we will note, however, that while experimental systems enter into the description of biomedical research, they do not cover the whole range of biomedical practices that stretch from the clinic to the research laboratory. Rheinberger himself is aware of the need for a notion that would go beyond individual research laboratories and encompass a broader range of activities such as those described in this book.[20] He has thus proposed—we assume somewhat half-heartedly—the notion of experimental cultures, somewhat reminiscent of Karin Knorr Cetina's notion of epistemic cultures.[21] We believe this notion is a nonstarter, because it signals a return to the culturalist, humanist assumptions that the notion of experimental systems was designed to avoid and that we have already criticized at the end of chapter 1.

Thus, while we have used Rheinberger's notion of experimental systems when discussing biomedical platforms, the two notions should not be confused. As we saw, the immunophenotyping (IPT) platform grew out of experimental systems set up in clinical and nonclinical immunology. Once in place, IPT reproduced the entities and distinctions generated by those systems in daily clinical and research practices. Generalizing, we can say that historically, an experimental system precedes a platform; yet, experimental systems presuppose the existence of platforms. Platforms are neither infrastructures nor experimental systems, but another configuration of the biomedical process. While both experimental systems and platforms create spaces of representation, the notion of platform allows us to focus on the regulation of the objects generated, rather than on the production of epistemic things.[22]

Within a larger time frame, platforms signal the transformation of medicine into biomedicine, a process that we have located in the postwar era. It can thus only be applied recursively to past events in the special sense that a present platform creates a common perception of the past. From a platform, the past is seen as caught up in a previous platform, for instance, as having been constrained by some technical problem. History recounted from the platform tells us that there is some consensus about what counts as technology in the present. To return to our

example of morphology vs. IPT, it is doubtful that morphology would have been understood as a platform at, say, the turn of the century. Yet, practitioners can retrospectively view morphology as a platform once the IPT platform is in place. In this sense, platforms must be understood as historicized, or, rather, historialized.[23]

Turning now to the empirical limits of our study, one might easily object (as, in fact, some of our readers have) that we have unduly generalized from a single case study and that while the notion of platform may be an appropriate rendering of the emergence of IPT, it does not go much beyond that. While it is true that most of our discussion is based on hematology, immunology, and pathology (which, by themselves, it should be admitted, cover considerable territory), there are two ways our argument can be easily extended. First, although we restricted our examples of the application of IPT to the earliest and, therefore, most easily accessible fields, the platform has not been restricted in its use to the aforementioned disciplines. Where there are white blood cells implicated in the disease process, IPT is a potential player. Second, our platform analysis does not rely on the existence of a single "immunological" platform. Numerous others arise whenever there is an attempt to articulate problems of biology with problems of pathology. Consider, for simplicity's sake, the outpouring of technologies from molecular biology over the last quarter of a century. For these technologies and the problems that they raise to find purchase within medicine, they must become platforms in the sense that we have given the term. Even as we write, a platform composed of molecular biological techniques known as reverse transcriptase and the polymerase chain reaction bundled onto a diagnostic platform in a variety of configurations is rearranging the classification of the lymphomas (once again) and other cancers.[24]

A second empirical limit to our investigation can be framed in terms of a question: to what extent does the platform we have analyzed affect clinical outcomes? Clearly, the answer here depends upon a number of considerations. Most AIDS patients in the Western world have access to CD4 counts. Note, first of all, the important qualifier "Western world." For countries lacking effective public health systems, many of the practices discussed previously are meaningless. Even when there is easy access to something like CD4 counts, it is next to impossible to know exactly how such numbers enter into clinical decision-making on a daily basis other than at an ideal-typical level. Practitioners may develop their own rules of thumb, ignore guidelines, or have their advice fall on deaf

ears. As readers will by now have gathered, variation is the rule and much the regulation that goes into the maintenance of a platform consists in discovering just how much variation there is. We cannot here substitute ourselves for regulators and say with any assurance exactly how IPT has changed the lives of patients and practitioners. Unlike therapies for life-threatening disease, there is no quick and easy body count with which we can make our case. Suffice it say that it is part and parcel of our argument that whether or not there is an immediate impact on patient care is less relevant in the era of biomedicine than it once was. As we saw in the debate between clinicians and pathologists in the case of the REAL (revised European-American lymphoma) classification, having the "right" biological categories was held by some to be more important in the long run than having the more "useful" clinical categories.

There is one other potential oversight in our treatment of biomedical platforms. While we have discussed the consistent failure to redefine pathological lesions in terms of the continuous function of a biological variable, as in the case of diabetes and the Pap test, we did not discuss the rise of "risk factors" (high blood pressure, high blood sugar, etc.) that precede the formation of lesions, and their relation to biomedical platforms. Unlike the reductionism criticized by Canguilhem, the construction of biological risk factors and their use in clinical trials, epidemiology, and clinical medicine has met with considerable success.[25] Note that while risk factors do not replace symptoms, just as prognosis does not replace diagnosis, there is a prevailing tendency to construe correlation as cause. There is no doubt that by making biological variables more readily available to the clinic, biomedical platforms contribute to the production of risk factors and the spread of statistical thinking. The new genetics and the associated biomedical platforms, moreover, will accentuate this tendency.

A Final Review of the Main Themes

In conclusion, let us briefly review the main themes examined in this book and discuss how the notion of biomedical platforms elucidates our understanding of the development of biomedicine.

Let us begin with the first theme, the emergence of a new way of conducting research in biology and medicine since World War II. We have described how, in the case of IPT, and in a manner consistent with trends since the war, biology and medicine came together, both institutionally

and intellectually, to create a hybrid practice that is neither syncretic nor synthetic. Rather, in analyzing the constitution of this practice, we described the creation of a *problematic* space of scientific representation in which truly biomedical entities—cell-surface markers—exist as both normal biological entities and as pathological signs. We showed that markers are, in other words, *biomedical* substances with regard to their origins, their uses, and their meanings.

This particular alignment of the normal and the pathological is just that, an alignment, not a fusion. As our discussion of Canguilhem and the related discussions concerning, for example, the evolving status of tumor antigens or normal and pathological experimental systems show, not only has the division between the normal and the pathological been constitutive of modern medicine, it has remained so. Despite the continuing redescription of pathological processes in biological terms, the notion of a pathological event resulting in a lesion remains central to the understanding of disease. We saw, for example, that Greaves's critique of the pathologist's notion of "dedifferentiation" resulted in the equally pathological construct of "uncoupling." This point is not always immediately evident as the rise of cellular and molecular medicine has tended to obscure this fact. Indeed, in the era of "molecular pathology" one might be tempted to say that biology has supplanted pathology as the form of explanation of disease.

Our second theme, the importance of regulation in the conduct of biomedical research, has highlighted a category of scientific activity that has too often been dismissed as "routine" or "applied" in the negative senses of these terms. In our description of the regulatory activities related to IPT, we have tried to point out how such work is necessary for the effective functioning of the platform; how, in a sense, regulation is a constitutive component of the platform. Rather than treating regulation as some dreary bureaucratic ritual, we have tried to describe and recapture the work, and indeed the innovative work, that lies behind such enterprises and show how such work relates to the construction and maintenance of an effective platform. The CD workshops, for example, did not merely assign conventional names to cell-surface markers; without the international collaboration, the markers could not have attained their international, independent status and been freed from the contingencies of the individual laboratories that produced them.

The notion of platform enlarges the connotation of regulation which, when viewed in terms of platforms, no longer appears as an obstacle to

fruitful work or innovation, targeting mainly routine activities. Regulation now appears as a condition for the production, circulation, and interchangeability of novel entities and practices. We are tempted to add a more epochal twist to our claim. Daston and Galison have convincingly argued that scientific objectivity, far from being a logical category, is a historical construct: there are many kinds of objectivity, and their emergence can be dated.[26] Thus, a form of objectivity grounded in the expertise of the skilled practitioner, or in the judgment of a group of experts, can be contrasted with the mechanical objectivity of inscription devices or recording instruments. Platforms embody a new form of objectivity, a regulatory one, grounded in the procedures of internal quality control and, especially, external quality assessment.

We defined biomedical platforms as material and discursive arrangements that act as the bench upon which conventions concerning the biological or normal are connected with conventions concerning the medical or pathological. We have used this category to describe a range of activities in contemporary biomedicine running from laboratory research to clinical trials and routine diagnosis. Has it been worth it? By looking at post-World War II biomedicine in terms of platforms, we believe that one can rethink a number of assumptions that have been nagging the science studies scholars for some time now. First of all, medical sociology and the sociology of biomedical research generally presuppose a division between mundane or routine medical activities and the more exceptional work of biomedical discovery and innovation. Thinking in terms of platforms allows one to see and analyze the continuities between these apparently distinct activities. Biomedical innovation, in other words, is as continuous as it is undirected and surprising. Going beyond the innovation/routine dichotomy, platform sociology thus opens up the field for the investigation of those activities that, borrowing a term from evolutionary economics, can be termed "innovating routines."[27]

The notion of platform draws together actors—physicians, researchers, industrialists, patients—as well as objects—research materials, specimens, standards, contracts, high-tech and low-tech equipment—that were previously thought to inhabit separate social worlds, although, empirically speaking, they are often found in the same room. Analyzing the different constituents of biomedical platforms shows cooperation and interdependence—between the various components of a platform and the related actors, as well as between platforms—to be

equally as important as, if not more important than, segmentation and conflict. As an additional bonus, the dichotomy between science and technology that has dominated the analysis of technoscientific and medical activities can now be overcome without being discarded. Whereas "technoscience" points to a problem without providing a solution or, in other words, raises an issue that still begs for analysis, a focus on the platform allows one to move from one contingent embodiment of the division to the other, without overlooking the continuities or denying the differences. In addition to articulating the normal and the pathological, biomedical platforms articulate the scientific and the technological.

As developed in this book, the notion of the biomedical platform allows for historical contingencies in the sense that the platform we have described is not a structural constraint on action; our description of IPT has no recourse to technological determinism. As we saw, researchers instantiated IPT in a variety of ways using components that articulated previous practices, as in slide-based IPT. A word of caution, however, is necessary here. Although they do not determine practices, platforms are not "social constructions" open to endless negotiation, leading to malleable natural and social arrangements. While the list of CDs is not fixed in advance, for instance, the scientific and cultural meaning of CD4 cannot be reduced to social variables. As an "entrenched" convention, it cannot be defined away. From this point of view, platforms are neither trivial conventions nor transcendental machines or concepts. We did not "see" the platform even when it was pointed out to us by the marketing director in the instrument factory. Nonetheless, manufacturers build platform components.

One final comment about the nature of the IPT platform: following our description of this category of practice and analysis one might easily conclude that the essential component of the platform, the cell-surface markers, is *somewhat* immaterial. Recall that we defined platforms as arrangements of things rather than the things themselves. In this sense, the core of the IPT platform is indeed less the cell-surface molecules than the arrangement and consequent understanding of those proteins as markers. In that sense, they are immaterial. This arrangement, however, is less ephemeral than might be imagined and we have underlined "somewhat" to call to the reader's attention the fact that because the markers have acquired standard meanings through regulation, they can be bottled and sold on the open market. In turn, their practical

and theoretical meaning depended upon their being bottled and exchanged.

Where do we go from here? Their heterogeneity and their contingent, local nature often characterize biomedical practices. The same pathology is treated differently in different institutional or geographic locations; indeed, what counts as the same pathology can also vary, along with the material practices used to define a given disease entity.[28] Yet, while individual patients are diagnosed within local settings, diagnostic decisions transcend local events, since treating patients requires continuity across time and space. The development of biomedicine coincides with a sharp increase in specialization, and, as we have seen, critics have complained that both medical knowledge and the patient's body have accordingly become fragmented. Yet these fragments are fragments of some body, and treating individual bodies requires relations of consult, rather than divisions of labor. Different styles of reasoning—statistical for epidemiologists, experiential for clinicians, and experimental for laboratory scientists, to which one could add lay reasoning for patient groups—define the various branches of the biomedical enterprise, yet there is a sense in which both promoters and critics of the latter perceive it as a coordinated whole.[29]

How is this possible? Standardization and new forms of collaboration between biomedical practitioners are part of the answer, but beyond standardization and cooperation, formal and informal regulations that allow for the continued existence of heterogeneities have become part and parcel of the biomedical enterprise. To understand biomedicine is to understand its regulation. Yet regulation does not target single objects or practices; rather, as we have argued, it targets the heterogeneous array of items and activities brought together by a given platform. Thus, the notion of platform should prove to be essential to further investigations of this process.

"I have a question. Say I want to use your platform sociology to analyze my own material, for instance, the application of molecular genetic approaches to schizophrenia. How should I go about it? Where should I begin? In other words, do you have a checklist of steps for performing platform analysis?"

"Well, we do not really like checklists and methodological algorithms, but here are a few indications. Start right in the middle of the game, with regulation. Look, for instance, to quality-control procedures, the meetings and discussions surrounding their development and enforcement, the formal and informal agreements in which they are grounded; from there, move up and down along the regulatory continuum, letting your investigation range from matters of equipment to clinical matters such as those discussed during consensus confer-

ences. Then, investigate the debates and practices surrounding the redefinition of the lesion that defines the disease. Do so with a view toward specifying biomedical (i.e., normal and pathological) entities that are both the input into and the outcome of this process. Finally, look for alignments with other forms of work. You can ask yourself, for instance, how the new entities generated by the platform have been articulated with previous ones, for instance, with prior diagnostic and prognostic classifications. Does this answer your question?"