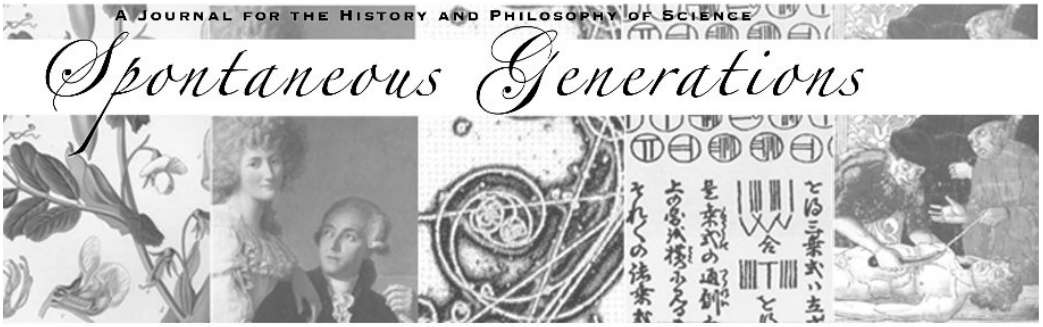

Taming the "Publication Machine": Generating Unity, Engaging the Trading Zones

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Taming the "Publication Machine"

Generating Unity, Engaging the Trading Zones[*,†]

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In this paper, we explore the particular issue of a biomedical research team engaging itself in different "trading zones" (Galison 1997). We do so by following the specific process of setting up a new microscope. We start by briefly introducing our general understanding of the concept of "trading zone." Then we focus on the empirical material we collected, starting from the microscope as the researchers we followed were setting it up. Our analysis is twofold: we first describe the acts we have been witnessing, then contrast them with the surrounding discourses and provide them with a rationale. We argue that the team created a sense of unity among its individual members and how this unity, though precarious, was needed and desired in order to further engage in a trading zone.

I. INTRODUCTION

In this paper, we explore the particular issue of a biomedical research team engaging itself in different "trading zones" (Galison 1997). We do so by following the specific process of setting up a new microscope, which tells us how the team created a sense of unity among its individual members and how this unity, though precarious, was needed and desired in order to further engage in a trading zone. We start by briefly introducing our general understanding of the concept of "trading zone." Then we focus on the empirical material we collected, starting from the microscope as the researchers we followed were setting it up. Our analysis is twofold: we first describe the acts we have been witnessing, then contrast them with the surrounding discourses and provide them with a *rationale*. We argue that the team was creating its own unstable unity.

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The term "trading zone" was coined by Peter Galison and refers to "a social, material, and intellectual mortar binding together the disunified traditions of experimenting, theorizing and instrument building" (Galison 1997, 803). It was further developed and pushed forward by Collins, Evans, and Gorman (2004), within the framework of the "Third Wave of Science Studies" (Collins and Evans 2002). Typically, trading zones occur among different groups or communities, through some form of exchange. Yet, in order to engage in such a trading zone, a group has to exist as such, as an entity characterized by a sense of unity and internal consistency. It has been long acknowledged that any kind of laboratory or research unit has its own particular principles and dynamics of unity. However, this unity is never to be taken for granted and constantly needs to be renewed or reinforced (Simoulin 2007).

Here, we show the centrality of the scientific instrument in such a process. Our study relies on empirical fieldwork realized in October 2009 at the research consortium CARIM (CArdiovascular Research Institute in Maastricht, the Netherlands). The research unit with which we collaborated (hereafter "the team") is located within the biochemistry department. It works mainly on thrombosis and haemostasis, especially their cellular aspects and the role played by platelets in the coagulation process. The team, rather small, includes a project manager, two post-doctoral researchers, and six graduate students. We provided semi-structured interviews with the researchers, collected photographic material, and recorded multiple field observations.

We will now start with observations we made around the setup of the team's new microscope, and analyse them in combination with the discourses it held.

II. Situation

A rather dark room unfolds complex yet mysterious devices all around; the stage is set for introducing the team's new microscope, called "SP5." It consists of a highly sophisticated assemblage of *analogue* (photonic lights, lens, camera, screens, etc.) and *digital* components that are designed to perform tasks together. To use it, the scientists don't usually look into the optical lens but rather straight toward the computer screens. The machine is set up for "flow experiments," in which the blood runs through the microscope, imitating arteries. The blood is labelled with a fluorescent marker, which can be detected by the microscope and layered with different colours. The different lights allow several experiments to run at the same time, instead of one after the other. Afterward, three-dimensional pictures and videos can be issued.

This impressive set of interconnected instruments was purchased

together with another team from the biochemistry department, in order to share its very high cost. At the point when our fieldwork was conducted, it had been unused for six months. However, the team's director wanted to have it handled and employed by the whole team. It actually required a collaborative effort in order for people to set the microscope up properly, so that each could actually use it while fitting his or her own research setup. We will argue that this process was actively generating a shared perspective for the researchers, by showing some of the actual interactions we witnessed that we believe to be meaningful in terms of the creation of a sense of unity among the team. This step was crucial in order to further engage in a trading zone, in a context of increasing pressure on researchers and a changing academic landscape. We will unpack this by analysing their discourses, which provided–among other elements–the rationale for actually setting up the microscope.

III. Creating Unity Through Collaboration and Learning

A negotiated setting

To start with, all the researchers from the team interacted together in the process of configuring the microscope at different times. A pool of two or three people would constantly take care of it, while others would travel back and forth from their regular research activities. In turn, each of them tried out the microscope with his or her own setup and assessed the results displayed on the screen, until a satisfying result was reached. Then, another one would give it a try, and so forth. Of course, this points out the high contingency of the microscope's potential results. There is no straightforward path to handle and configure such a complex multi-device instrument.

The common goal implicitly assigned to the team was not to reach an absolute "best result," if such a thing ever existed, but rather to find the "best fit" for the microscope, so that everyone could use it within his or her own research framework. Interestingly enough, the researchers would step back to their old, familiar and internalized techniques in order to check and validate the quality of their data. They were using their well-known old microscopes as an *étalon* of verifiability for the performance of the new one.

These elements call for two observations. First of all, the instrument is central to the team, not the other way around. Even though each would follow his or her own logic, interests, and research methods, everyone would gather around the microscope and get adapted to it, while adapting it in return. This shows a truly negotiated process, in which the instrument connects the researchers. Therefore, it brings up collective work and, in

this respect, brings unity to the team. According to Simoulin, who made similar observations about a Synchrotron in Grenoble, the instrument operates a "mediation" of its users (Simoulin 2007, 238); in our case, it brought scientists and service engineers together.

There is a second way in which the microscope gives substance to the team, namely by contributing to the definition of a shared team identity. Researchers from the team were proceeding with a rather trial and error iterative process. They would try out a particular configuration, see whether it worked (i.e., if it produced a satisfactory picture on the computer screen), and, if it did, what changes would make it better, according to their goals. We analyze this as experimental "bricolage," which may at some point contribute to the elaboration of a professional identity (Jouvenet 2007). Researchers had to elaborate imaginative practices. According to one of them, a strong sense of intuition and imagination was needed when engaging oneself in the process of configuring such a highly complex machine.

Learning processes, outside and inside the laboratory

Despite these elements, it is worth mentioning that the researchers were not alone in this process, but neither were they privy to the outside engineers' insights, and vice versa. So, if ever some stabilization was achieved by the end of the process, it was also partly the result of complex and multiple interactions. We point out two examples:

Firstly, researchers got involved in the setup of the microscope together with a service engineer from the private firm who provided it. According to the team director, the presence of this highly skilled technician made the case for eventually bringing people together and configuring the microscope. The service engineer followed and supervised each step of the researchers' work, providing a little bit of help here and there, whenever it was asked for or obviously needed. Everything would be on standby for a short while allowing him to proceed with his intervention.

This, in our opinion, shows the actual permeability of the team we studied to the world outside their laboratory, as a relationship of interdependency was developed with this technician and, through him, a private firm. On the one hand, both the microscope and its new software need to be handled. This association demands a varied range of skills in order to master the entire machine. The service engineer supposedly brings this expertise to the researchers. Yet, on the other hand, he would admit to not being able to handle the huge complexity of the microscope by himself. In this respect, he was also learning from the researchers' manipulations. A mutual learning process obviously occurred

here, influencing the work provided by the team.[1]

We witnessed a second similar and significant process happening as one of the researchers would, for example, confess a disinterest in computer tools. He was somehow reluctant to engage in computer work. Other researchers provided this person with tutorials and explanations so that he could handle the tools required. This contributed to the team's unity by generating solidarity through the learning process.

So far, we observed different sets of interactions that took place among researchers and a service engineer. These actual interactions show how a certain level of team unity was created. Each researcher would have to find sufficient room within the team to use the microscope while allowing others to do the same. The scientific instrument was central to this process and was the platform that would gather people together, while providing enough flexibility to be able to be appropriated by all its members. We hypothesize that this process was crucial in the establishment of a community–a unit able to actively "trade" on its outcomes and expertise, probably in a context of ever increasing "big science" (Galison and Hevly 1992). The instrument, in our case, performed the role of a "mortar binding together the disunified" practices "of experimenting" (Galison, 1997, 803).[2]

Much of our empirical evidence points to practices that are relevant to the concept of the trading zone, if one considers that the microscope could be this empty receptacle of each one's interests and meanings. Hence, it has arguably fulfilled the role of a "pidgin" language in the process of being set up. Was this process desirable or needed? Why did the researchers engage in such a complex and demanding task?

IV. Why Engage? An Analysis of Discourse with a Threefold Repertoire

Our attempt to answer this question comes through an analysis of the team's discourse, as its researchers kept on justifying both the desirability and the necessity of handling their new instrument properly. It does make sense to raise this issue, as it provides the *rationale* for acting as they did and as we reported above. Henceforth, the analysis will focus on the claims made by researchers themselves in order to justify

[1] This process was not without fear and concern. Understandably, one may be uncomfortable with having to delegate competences or feel alienated towards the instrument. Galison develops these potential concerns further in *Image and Logic* (1997, 143 onwards).

[2] We borrow Galison's understanding of the trading zone to show how the instrument, in our case, fulfilled this central and unifying role of the "mortar," but at a lower level, binding with researchers' practices rather than "traditions."

their actual engagement in the process of setting up their microscope. Here, we argue that they subtly blend different kinds of arguments, which always position themselves with regard to other communities or groups. That is, if we acknowledge that trading zones may occur at different levels–subdisciplines, groups, etc.–our researchers engaged and positioned themselves in different trading zones, assisted by the centrality of the microscope. For this purpose, we disentangle the multiple bits of information that researchers would deliver to us every now and then throughout our study. Doing so, we identify three particular repertoires of legitimation discourse: scientific, economic, and strategic.

"Scientific"

The first repertoire was "scientific." Firstly, setting up an improved technological means would lead to previously unreached results, which would eventually advance scientific knowledge. Interestingly, these results would incontestably be described as the best one could get out of such a microscope. They would be valid on an absolute basis. A significant amount of statements would endorse this view and one's duty to "*set up the microscope properly so that you get the best out of it.*" This argument, rooted in a classic idea of scientific progress, implies that improved technology will provide improved results, in a mechanical way. It that respect, it refers to a more "algorithmic" conception of knowledge (Collins 1985).[3]

Yet, secondly, the scientific repertoire of legitimation has another face, which relates to the issue of professional identity and the culture of "bricolage" we mentioned above. Some of the researchers we engaged with would envision science as a playground in which they would have fun with their research activities. This, we believe, was wonderfully put in this statement: "*If you don't need all the fancy stuff from this machine, why should you use it?*" Researchers would also make broader statements about desirable scientific values, such as the importance of collaboration or disinterestedness. In a sense, this repertoire of argument would tie them, even loosely, to the scientific community at large, in a way that classically tends to erase its intrinsic heterogeneity. These elements helped them position themselves within a sub-field of research, letting

[3] In the same time, on a purely technical basis, the new microscope does have more capabilities than the older ones, in terms of precision potential, 3D motions, or image issuing (tools to handle and visualize the data). But it is by no means more efficient on its own; it may be so only if researchers learn to handle it (forgetting custom habits with former tools) and actually use it, which are painstaking tasks requiring "blood, toil, tears and sweat."

them bring up their vision of science, their values, or team identity to the thrombosis and haemostasis areas of research.

"Economic"

The second repertoire was much more "economic." The "state-of-the-art" SP5 microscope is very expensive. This is the reason why it was purchased together with another research unit of the biochemistry department, as previously mentioned. The process of getting funding for this microscope proved to be quite painstaking. At the time of our fieldwork, it had been unused for six months. Over this period, the necessity to learn how to handle it became a matter of urgency (to preserve the transitory "novelty" of the instrument–see below). There was also an obvious feeling of guilt at play, according to which time and money would have been wasted if the potential of the new microscope was not reached. Through a wide range of statements, researchers–especially the junior ones–would refer to external pressures, a rapidly changing context, and the increasing difficulty of maintaining their team's competitiveness. Of course, the microscope was envisioned as a privileged means in order to achieve this economic goal: to survive and compete as a research team.

This competition issue was already salient, even regarding the relationship with the other team who co-purchased the microscope. It was basically a very good relationship involving strong personal ties. Still, we observed an interesting issue concerning the lens of the microscope. The other team had broken it a few months earlier. The price of a new lens is very high and thus problematic. Furthermore, such a lens is extremely fragile and researchers need to manipulate the optical setting very cautiously. It is a matter of shame, and an embarrassing economic issue, when a lens is broken. The team we were observing happened to break its own lens (each team has a different one fitting its particular research purposes) while we were there. They expressed both disappointment and frustration. Disappointment was mainly expressed in terms of their relationship with the other team; they were proud of having preserved their lens better than the other team throughout the months. Frustration was expressed owing to the fact that their research would henceforth be slowed down by this unfortunate event and some expressed, although not too loudly, this frustration regarding the other team's work, which could be maintained at a faster pace.

These economic arguments are of increasing importance. If we are to take seriously the claimed need to purchase "state-of-the-art" instruments in order to compete and eventually survive, then we subsequently understand that this reality brings up new means of engaging and collaborating with different groups or communities. Again, in our case, the

microscope was central to this process. It made the cases for teaming up with another unit from the department and for engaging in extended interactions with the service engineer from the private firm.

"Strategic"

A third repertoire we detected was much more "strategic" in nature. The microscope provided a competitive advantage within the scientific community and, since very few models of this microscope were circulating among laboratories ("*only 5 or so in the Netherlands*"), researchers perceived it as an easy and straightforward path to publications. We couldn't help noticing that this argument would be mainly expressed by junior researchers, one of whom summarized it neatly in this explicit statement: "*It's like a publication machine.*" Some of them shared with us their conviction that, once "properly" set up, the microscope would immediately and autonomously deliver "publishable" results. As we showed earlier, the SP5 microscope provides a convenient way to publication, especially through the interconnections of its many devices. This complex and sophisticated assemblage allows for great visualizations of data, including three-dimensional motions and neat and colourful pictures. The weight of these potential outcomes was quite often explicitly used to explain the strategic potential of the microscope in terms of publications. To us, this points to an increasing pressure on junior researchers through evolving means of research evaluation. Some of them directly expressed that it was an issue of "publish or perish," so to speak, that is of great importance for their potential career paths.

Here, we clearly see how different strategies and positions address a larger context. This shows up as an evolving modality of interactions among different research groups or communities. We argue that the strategic positioning is also relevant to the interactions within a trading zone, for example the thrombosis and haemostasis area worldwide, let alone in the Netherlands.

As for engaging with the setup of the microscope, we pointed out how researchers constantly mixed different repertoires of argumentation together with entangled values, interests, concerns, strategies, expectations, and so forth. For instance, Baird and Cohen argue that trading between groups guarantees stability only in a "gift economy," as opposed to a "commodity economy" (1999). In our particular case, where most trading occurred at a lower level (i.e., mostly interpersonal), this neat division seemed simply overruled by the facts. Each researcher would follow his or her own individual interests while meeting the collective ones of the team, would learn skills, and challenge his or her own knowledge and practices. In the end, what appears most important to us is the fact

that, whatever the motives to do so, they each eventually engaged in the process of setting up the microscope, providing it with centrality, and allowing it to have structuring effects on the team as a unit.

V. Brief Discussion and Conclusions

Following Galison's pioneer work, we point out another case where the centrality of an instrument is salient. We focus on the particular process of configuring a microscope, by means of genuine negotiation among the members of the team, which actively produces stabilization of the team to the point in which it eventually reaches provisional unity. Following this issue and its underlying justifications we find that the team needs this process in order to get a stronger "currency,"[4] so to speak, to further engage different trading zones. In each of these situated trading zones, different "rules of exchange" are enforced between different groups and vary depending on the particular circumstances and the logics of action, the scope, and the values or interests carried out by each of these involved groups.

In this respect, the concept of trading zone is itself in a trading zone. It is loose enough to endorse different disciplinary interpretations. Its intrinsic heterogeneity allows for multiple re-appropriations or understandings of the concept. An easy way to make this point is to refer to the increasing disciplinary diversification of the notion of "trading zone" (Collins, Weinel, and Evans, forthcoming). In our opinion, as the "trading zone" is a rapidly spreading concept, it may deserve further classifications or typologies of all the cases to which it might apply and of the variety of situations it may cover. Eventually, the concept proved very useful and flexible enough to follow the multiple and complex issues tied up with the process of setting up a microscope.

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[4] The term "currency," though improper, restitutes faithfully our intended meaning, which refers in general to any means (not only rules) of exchange.

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