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Formats as Media of Cooperation

Axel Volmar

"If there is such a thing as media theory, there should also be format theory," writes media scholar Jonathan Sterne in his book *MP3: The Meaning of a Format* (Sterne 2012: 2). Some five years later, as a growing number of scholars from a variety of disciplines are expressing a particular interest in the study of formats, it seems adequate to speak of the emergence of *format studies* as a new research field. In 2017, three conferences in the German-speaking world alone investigated formats from various disciplinary perspectives: in September 2017, the symposium "Vom Medium zum Format?" took place at the Ruhr University Bochum; in October, the University of Bern organized a conference on formats from an art historical perspective; and finally, the University of Mainz hosted the international conference "Format Matters" in December 2017. However, and despite an increasing number of works, a "format theory" as envisioned by Sterne remains to be written. This article represents a first step toward outlining a systematic approach to the theory of formats. To this end, I will assemble some of the fundamental types, features, and functions of formats in past and present media cultures to assess their potential significance and relevance for contemporary media studies.

As I will demonstrate, formats—in their literal meaning as things brought into "form" or "order"—frame and configure media in fundamental ways while also linking different domains of media production, distribution, and reception. Moreover, I will show that formats are not only crucial for understanding the aesthetic dimensions of media but also how people create, work with, and consume media. In other

words, formats are linked, in fundamental ways, to *practices*. In recent years, Nick Couldry has prominently advocated for a practice-theoretical approach to media and communication studies, an approach he has termed "media practice theory" (Couldry 2012). Couldry's approach encourages media and audience research scholars not to limit themselves to the philology of media "texts" or the political economy of media institutions, respectively, but to direct their focus toward "what people […] are doing with media" and specifically how they integrate media, and especially digital media, into their everyday lives: "It is only in everyday media practice and everyday assumptions about how to get things done through media, where to get information and images from, what can be circulated and how, that we get a grip on media's relations to society and world." For this reason, Couldry has termed his approach a "socially oriented media theory" (Couldry 2012: 6–9).

Couldry further calls for studying the "materiality of representations", with the aim of taking "seriously the social as a site of material constraint and possibility, and media's role in its construction" (Couldry 2012: 32). In his book, Couldry explains his approach by identifying a number of new fundamental media practices, such as "searching and search-enabling," "showing/being shown," "presencing," "archiving," and a variety of more complex media-related practices (Couldry 2012: 43–58). While this approach is both inspiring and productive in extending audience research beyond the realm of mere media consumption, its selection of practices, with a clear focus on end users, hardly covers the gamut of "what people […] are doing with media." Moreover, due to the deliberate focus on representations, all practices chosen by Couldry emphasize "how the *meanings* circulated through media have social consequences" (Couldry 2012: 8, my emphasis). Thereby other, arguably less obvious but nevertheless equally ubiquitous practices that involve 'media,' such as bureaucratic or juridical practices of coordination, delegation, or registration/identification (Giessmann 2017), run the risk of evading the attention of such a perspective.

In contrast to Couldry's approach, which directs attention to the effects of "large-scale media institutions" on how individual media users process and circulate meaning, my goal here is to study how diverse forms of *work* and *cooperation*—between different actors both human and non-human—are being constituted, stabilized, governed, and changed by and with media technologies. In doing so, I follow recent efforts to reconceptualise media beyond their more traditional definitions as 'mass media' and 'media of communication' and instead as "logistical media" (Peters 2015; Rossiter 2016) and "media of cooperation" (Schüttpelz 2017). These efforts demand a shift not only in scholarly perspective from the content to the contexts and relational aspects of media but also toward promoting the study of media practices rather than media products. Thus, alongside considering media practices related to production and reception of content, i.e. representations or meaning, I focus on the quotidian purpose-oriented uses and mobilizations of media and their crystallizations in material artefacts. People not only consume media products, such as news, entertainment, or web content and services, but also organise their daily lives through them by means of "infrastructuring" (Star and Bowker 2002), or establishing, engaging in, and resorting to different forms of cooperation. These modes of cooperation occur in three different relationships: among humans, between humans and machines, and among different machines. This infrastructural conception of media use is closely aligned with what John Durham Peters has recently called "elemental media" (Peters 2015). In this context, formats can be regarded as the means and the objectified results of practices of infrastructuring media and infrastructuring with media; therefore, they are also the links or interfaces between a wide range of actors and their practices. As examples, formats can help practitioners and machines collaborate over geographic distances or help link professionals to consumers. With this in mind, I argue that formats should be considered fundamental materializations and reference points of work-related media practices.

In the remainder of this article, I argue that formats play particularly important roles in enabling and constituting diverse forms of cooperation. More specifically, I claim that formats are, in a paradigmatic sense, media of cooperation. Due to their capacity to both enable and enforce cooperation amongst potentially very heterogeneous actors and beyond the limits of local boundaries (Star and Griesemer 1989), I would further like to suggest that formats represent crucial prerequisites for the development of extensive and complex media systems, infrastructures, and industries (e.g. national or transnational). In order to demonstrate this, I first present a short overview of the current scholarly interest in formats. I then turn to the cultural history of formats—both in terms of etymology and material culture—from which I draw a preliminary typology of formats. In the final section, I discuss some of the common features and functions of formats to support my claims that practices of cooperation and scaling up rely on formats as necessary conditions of media possibility.

I. The current interest in formats

Before attempting to gather some of the building blocks for a general theory of formats, it seems adequate to recall relevant reasons behind the blooming scholarly interest in the topic throughout the last years. In his book on the history of the mp3, Jonathan Sterne examines why and how the mp3 format became the primary form in which recorded music was circulated via digital devices and network infrastructures at the turn of the 21st century. Using the mp3 as a case study, he addresses various epistemological, cultural, and political aspects within the history of digital audio to better understand the "distributed character of culture in our age" (Sterne 2012: 1). By covering a period of more than a century, Sterne shows that formats embody important sedimentations of scientific knowledge, cultural practice, and politics:

> The MP3 carries within it practical and philosophical understandings of what it means to communicate, what it means to listen or speak, how the mind's ear works, and what it means to make music. Encoded in every MP3 are whole worlds of possible and impossible sound and whole histories of sonic practices. (Sterne 2012: 2)

Therefore, he considers the mp3 file format to be the best entry point for a cultural history of sound and communication in the 20th century. And indeed, it appears to be an extremely smart move to tell the evolvement of 20th century acoustics and sound media along the lines of a format history because, without these inventions and developments, the mp3 would not have come into being as a "cultural artifact" in quite the same way it did (Sterne 2006). For Sterne, the emergence of digital file formats, and especially those based on techniques of data compression, prompts a shift in scholarly perspective from the conditions of media production and consumption to the processes of media distribution. The study of formats, according to Sterne, therefore demands a gradual shift in scholarly attention from the content of media—including its qualities and effects—to the logics and conditions of the circulation of media artefacts. This includes a close consideration of the ecological configurations, such as transmission networks and hard- and software infrastructures, that make these circulations possible—and profitable.

In his book, Sterne focuses primarily—though not exclusively—on digital file formats. However, of course, many other types of formats exist, all of which spark different sets of scholarly interests and research questions. In Germany, for instance, film scholars Oliver Fahle and Elisa Linseisen propose the study of film formats, such as HD (Linseisen 2017), as a solution to resolving the problem of media conversion, i.e. the perceived dissolution of individual analogue media (or *Einzelmedien*) in the universal medium of digital code. While the general process of digitalization might threaten to dilute the more traditional notions of "media," formats seem to lend a certain concreteness to how we can under-

stand the medium of "film" in the digital age. Moreover, small gauge and other substandard film formats point to different film cultures, appropriations, and practices of reception, for instance by amateurs (Jancovic 2017; Schneider 2016a, 2016b).

In the discourse of art history, the study of formats even reaches back into the 19th century. In 1896, the well-known German art historian Jacob Burckhardt delivered a talk entitled "Format und Bild" ("Format and Image"), in which he pondered how art works related to their immediate surroundings and how they were altered by practices of reframing and reproduction (Burckhardt 1918). Recently, David Joselit has also placed a similar emphasis on the relation of art works to socio-political, economic and physical environments in the context of contemporary art. In his book *After Art*, Joselit conceptualises contemporary art works as forms of "international currency," which are—just like other currencies—both stored locally in "banks," i.e. museums and galleries, and circulated and traded globally (Joselit 2013). With this focus on the worldly rather than symbolic effects of art, Joselit is interested less in the meaning of specific art works, or what they represent, than in their concrete operations in the world. In an interview with David Tasman, Joselit explains:

> What I define as a "format" is a strategy for activating the space between what an image *shows* and what an image *does*. […] The artwork almost always contains vestiges of what might be called the roots—or infrastructural extensions—of its entanglements in the world. These might include the means of production of the image, the human effort that brought it into being, its mode of circulation, the historical events that condition it, etc. The artwork's format solidifies and makes visible that connective tissue, reinforcing the idea that the work of art encompasses both an image and its extensions. (Tasman 2015: n.p.)

It is revealing that both Joselit and Sterne point to the significance of "infrastructural extensions" of artefacts, which is to say the relational aspects between objects and the social environments and physical infrastructures that surround them as well as the conditions and practices of their circulation. Formats, it seems, embody specific affordances that specify less what objects mean than what can be done with them. Before discussing possible consequences of this particular property for a general theory of formats, I will first ask more broadly, in the next section, how formats emerged as phenomena and objects, what kinds of different formats evolved, and ultimately, how we might conceptualise them theoretically.

II. A Typology of Formats

The noun "format," which seems to have first appeared in the form of the Modern Latin *liber formatus*, "a book formed" in a certain shape and size, is derived from the past participle of the verb *formare* ("to form") and literally means something brought into a certain form or order. In the 16th century, the notion became widely used as a technical term within the emerging printing industry, where the format indicated the spatial dimensions of paper sheets and books. The designations of book formats, however, referred not to absolute geometric values but rather to the number of pages produced from a single sheet of paper by means of folding it. The *atlas* or *great folio* format, for instance, indicated the use of unfolded sheets for printing (thus consisting of a front and a back page), while the *folio* format, as the name suggests (*foliō* is ablative of *folium*, the Latin word for "leaf"), produced four pages per sheet by folding it once and having two pages on each side. Following the same principle, books in the *quarto* format consisted of eight pages per sheet (two folds), the *octavo* format of sixteen pages (three folds), and so forth (Gaskell 1972: 80 f.). As this example makes clear, formats have served from the very beginning to *organize information* on material inscription surfaces and, to a certain extent, came to *embody labour practices and*

workflows. Throughout the following centuries, the notion of the format became a general container term for the indication of sizes, dimensions, and aspect ratios of objects and media artefacts in general. We can discriminate at least five fundamental types of formats (possibly more), all of which are connected to both media technologies and media practices.

1. Size-and-shape formats

Originating from book formats, *size-and-shape formats* frame and dimension the display and presentation of—usually visual—content by means of limitation, orientation, and alignment. This is probably the most common type of format. Two-dimensional size-and-shape formats determine standardized and non-standardized sizes of inscription and display surfaces and indicate the physical properties of the involved materials and storage media. There are print formats to designate the size and ratio of paper sheets, letters, books, or newspapers, image formats in photography, and moving image formats in film and television. Moreover, formats often also specify the orientation and aspect ratios of the presented information—think portrait vs. landscape format. Different denominations relative to size, such as "small gauge," "pocket book," or "large size" further hint to the fact that even simple size-and-shape formats are already closely linked to practice, as they are often specifically tailored to facilitate or encourage certain uses—both in the realms of media production and consumption. Paperback books, for example, are lighter and smaller than regular books to enable reading outside of the home, while 8-mm film formats were conceived to render film making affordable for non-professionals. In this respect, formats can both unite and divide different user groups or "communities of practice" (Lave and Wenger 1991; Wenger 1998), such as professionals and amateurs.

2. Diagrammatic and structural/structuring formats

Formats provide a general framing of information but in many cases, they also determine the spatial, temporal, or logical *structure* in which content is stored, transmitted, and presented. In that sense, the notion relates to the evolutionary term "formation" and is further reminiscent of the fact that the word "information" literally refers to data and other symbolic content that have been brought in formation, i.e. arranged in a specific form. This entails, in particular, the *diagrammatic* division and ordering of information surfaces, e.g. in the form of lists, tables, and especially forms and other previously structured, pre-formatted documents (Gitelman 2014), all of which bring to mind saturated histories of bureaucratic practices, e.g. for registration, inventory, and book keeping. As for instance Bernhard Siegert has emphasized in his book *Passage des Digitalen*, such diagrammatic subdivisions of writing spaces, e.g. of cuneiform tables, already bear symbolic meaning themselves, and not only in terms of their content (Siegert 2003, 39). Moreover, some inscription surfaces demand specific practices of preparation and care before they can actually be used as symbolic media. Such practices of *formatting* are among the oldest cultural techniques we know: for instance, we can read the ploughing of land in order to prepare the soil for proper cultivation as a practice of formatting. Derrida reminds us of this connection in *Of Grammatology* where he writes about the connection of ploughing to the history of scripture:

> It is a matter of *writing by furrows*. The furrow is the line, as the ploughman traces it: the road—*via rupta*—broken by the ploughshare. The furrow of agriculture, we remind ourselves, opens nature to culture (cultivation). And one also knows that writing is born with agriculture which happens only with sedentarization. (Derrida 1997: 287)

Like the soil, inscription surfaces, such as cuneiform tablets or parchment, need to be cultivated and prepared in order to allow writing. By way of formatting, practices of usage are once again inscribed into the formats themselves. Formatting, of course, is also one of the key concepts in typesetting and graphics design, used in conjunction with rules and practices of text and image layout (see also Müller 2014).

3. Metaphorical uses

Presumably derivative of large book and image formats are metaphorical significations of the term. In German, for instance, the noun "Format" is commonly used as a denomination to acknowledge individuals of high rank or extraordinary capabilities, achievements, character, or authority. For instance, a person is supposed to *have* format ("Format haben") if they are deemed capable, thanks to e.g. expertise, talent, or moral greatness, of filling in an imaginary *frame of expectation*. Individuals may also *show* or *demonstrate* format ("Format zeigen"), for instance in situations that call for great courage or present difficult choices, such as between the individual and the greater good.

4. Encoding of information and data streams

Another frequent type of formats comprises techniques of encoding information and data streams. These are formats used for number, calendar, and time or those conceived to store and reproduce audio and video information, including digital file formats. Such formats are characterized by the introduction of additional data, or metadata, into the content or signal flow, such as information about how to render the content into a usable or consumable form. Primarily but not exclusively tailored to enable automated forms of reading, writing, and processing, these metadata—such as the playback speeds of vinyl records, line and page breaks in analogue TV signals or information in the headers and structure of digital file formats—regulate how information and data flows

are to be handled (e.g. stored, transmitted, displayed, or processed) by both people and—especially—technological apparatuses.

5. Event and narrative formats

Finally, the term "format" has increasingly come to denote strongly regulated and scripted events that follow predefined concepts, rules, or sequences, such as performance, trading, or auction formats. First and foremost, however, this group of formats entails and comprises the many event and narrative *formats* for different categories of shows, such as news, music, talk, or game formats, which were conceived in the broadcasting industry. In this signification, formats often refer to the overall concept, trademarking, and branding of—generally copyrighted—media programmes or even entire stations, as becomes apparent in the so-called "format radio" stations, commercial stations which are tailored to cater to narrow target audiences in order to maximize ad revenue. German media scholar Knut Hickethier defines such media formats as "media-industrially optimizable genres," a definition which emphasizes the often highly serialized, commodified, and industrial character of the term (Hickethier 2010: 152). In the case of narrative media formats, the connection to practice is particularly manifest, since "format" denotes specific framings of performative actions.

Contrarily to artistic "styles," however, which—stemming from the Latin term for *stylus*—point to the creative process and individual forms of artistic expression, or the notion of "genre," the different types of which commonly emerged out of an evolvement of narrative elements and forms over longer time periods, broadcasting formats are usually the result of deliberate decisions directed at raising attention and increasing recognition value. Formats, such as *Who wants to be a Millionaire?* or *The Voice*, usually consist of meticulously defined recipes, which are tailored to specific target groups and designed to enable the industrial production, potential franchising and international licencing of a show or media product in multiple geographic locations and markets,

while still allowing for smaller adjustments, for instance to accommodate a particular national or cultural context. A narrative media format, in this sense, is a genuinely economic construct conceived to allow a particular concept to be both uniquely recognizable and transferable to new local contexts within the international media market.

With all of these format types unfolded, a number of questions arise. How do these different types of formats connect? What do they *do*? And more broadly: how can we conceptualise them? To answer these questions, I will consider some of the basic features and functions of formats expressed in the last section in order to draw a number of conclusions as to how we can understand formats more broadly.

III. Common Features and Functions of Formats

Presumably the most fundamental feature of formats concerns *limitation*: formats frame and otherwise determine the spatial dimensions and aspect ratios (e.g. 16:9) of inscription surfaces or regulate the volume or temporal dimensions of art forms or media content (think short stories vs. novels, short films vs. feature films, and singles vs. long-playing records). Thereby, formats govern a number of basic qualities and "affordances" of a given medium (Gibson 1979). Secondly, formats determine the diagrammatical (spatial) or sequential (temporal) *structure* of the content, information, or data in question. In documents, such as lists and forms, for instance, spatial layout is used to prescribe what kinds of information are expected in a bureaucratic procedure (from filing tax reports to registering for an app or online site). Thereby, the formatting of the inscription surface ensures, for instance, the homogeneity, accountability, and completeness of the data (Gitelman 2006; Schüttpelz 2017; Siegert 2003). In the temporal domain, formats determine essential narrative elements on various scales, from the sequential organization of a TV show to the micro-segmentation of information flows in technical media, such as television signals or digital multimedia formats.

Through limiting and structuring content, formats also shape, directly or indirectly, the *ratio between the information content and the physical capacities of a given medium*, be it storage space, transmission bandwidth, or the processing power of a technological system, network or labour chain. After the introduction of optical film sound in the late 1920s, for example, the image frames on 35-mm film stock had to be slightly reduced in size (while preserving the aspect ratio) in order to literally make space for the sound track. Since the introduction of digital sound, analogue film stock became even more crowded with information stemming from the Dolby Digital and SDDS sound tracks and the DTS sync codes. In a similar manner, the limited bandwidth available for television broadcasting presented constraints in the temporal and spectral domain, which, for instance, affected how engineers defined the resolution and colour coding schemes of the NTSC colour television signal in the early 1950s (Mulvin and Sterne 2016).

In short, this relation between the volume of information on the one hand and the limited capacities to store, transmit, and process information on the other illustrates how deeply information processing is rooted in material realities. Hence, one of the main functions of formats consists in reconciling the differing demands regarding the content and the materialities of a given medium, respectively. This interrelation is also the reason for the close connection between formats and infrastructures or, as Joselit calls it, the "infrastructural extensions" of formats (Joselit, as cited in Tasman 2015). Since the technologically possible is more often than not hampered by the economically justifiable, formats are introduced as intermediaries to match the shape and structure of individual messages (including their sizes, aesthetics, affordances, etc.) with the requirements enforced by the surrounding infrastructures and media ecologies usually designed to be utilized by a large number of users (Sterne 2015).

This fundamental function further explains why formats tend to make heavy use of cultural techniques of compression. Compression

techniques—from the folding of letters through microfilm photography to digital compression algorithms—enhance the capacities of limited resources by strategies of efficient packaging, coding, or reducing the size or definition of content. Compression techniques are usually deployed to keep storage or transmission costs in check (high-resolution analogue film stock, for example, is expensive to buy while digital film can be expensive to store) but can determine the degree of mobility or portability of messages and media artefacts in relation to the capacities of the infrastructures in which they travel (see also Sterne 2012). However, the benefits of compression are likely to come at the cost of an altered aesthetics and experiential quality of compressed media artefacts. In order to travel well through economic and physical infrastructures, reproductions populate the world predominantly as what Hito Steyerl has called "poor images" (Steyerl 2009). Jonathan Sterne describes this trading zone as an ongoing interplay in the history of media technologies between the ideals of "verisimilitude" and the ideals of "compression" (Sterne 2012). Thus, by harmonizing media artefacts with infrastructures, formats assume fundamental *logistic and economic functions* within media systems. Once new formats become accepted as trade-offs between different demands, they tend to fade into the "background" of infrastructure (Star and Ruhleder 1996) and can prove to remain stable over relatively long periods of time.

A second key function of formats concerns their ability to foster and sustain *compatibility and interoperability*. As many of the above-mentioned examples have shown, the majority of formats tends to possess considerable degrees of standardisation (Schueler, Fickers, and Hommels 2008). Although the terms "standard" and "format" can overlap in their meaning, the main difference between the two lies in the simple fact that formats most commonly standardise objects and processes that deal with and display symbolic or aesthetic content. Formats can thus be thought of as *media standards*, specific configurations that make both the form of media artefacts and the processes and practices

connected to them more consistent, predictable, and accountable—especially in terms of cost and usability but also, as in the case of narrative media formats, in legal form. In this regard, it seems worth noting that formats often come in predefined sets or families of fixed sizes, such as, for instance, the ISO A, B, and C series of paper sizes. In the case of paper, the fixed dimensions channel the sheer infinite possibilities of potential sizes and aspect ratios to a number of fixed choices or grids. This reduction of complexity can result in a greater compatibility and interoperability between devices or software applications (e.g. from different manufacturers), which, in turn, can render complex processes and workflows, such as working with paper, more flexible and predictable.

For the same reason, formats can enable and sustain diverse forms of cooperation and collaboration. Formats act as important interfaces or "boundary objects" for encounters between humans, non-humans, and "heterogeneous social worlds" (Star and Griesemer 1989). Due to their conventional nature, formats can both facilitate and dictate the cooperative practices and transactions, such as, for example, hand-overs between departments or devices. Thereby, formats ensure, on the one hand, that media artefacts are able to travel along the lines of complex production and exploitation chains. On the other hand, preassigned formats can help establish and sustain more efficient and finely grained divisions of labour and facilitate collective work practices. For example, the critical factor that allows for a collective development and an ongoing expansion of Wikipedia through crowdsourcing is less the platform or website as such but rather its formatting specifications, the so-called "Manual of Style," and the established procedures to incentivise and ensure compliance (Wikipedia 2017). Due to this regulating effect, formats often afford or even embody certain workflows. Following Gaston Bachelard, who famously claimed scientific instruments to be reified or "materialized theories" (Bachelard 1984, 13), we could therefore conceptualise formats as *reified practices*. In a similar manner, Bruno Latour

has captured the consolidation of practices into things as processes of "delegations" (Latour 1988).

Drawing from the basic—though by no means exhaustive—features and functions of formats, I want to end by suggesting two general claims regarding the nature of formats and their potential relevance for media studies. Situating formats within a broader history of media illuminates the fact that "media" have never been mere means of symbolic communication or mass distribution but rather, in the words of German media scholar Erhard Schüttpelz, "cooperatively developed conditions of cooperation" (Schüttpelz 2017: 14). In line with Schüttpelz' conception of media, I first want to argue that formats, conceived as media standards, "boundary objects", and materialized practices or "delegations", represent paradigmatic *media of cooperation*. Therefore, the study of formats and their histories can contribute to the question of how co-operation, especially beyond local boundaries, can emerge and unfold. As media standards, formats reduce ambiguity, provide orientation, and facilitate planning, making them a basic condition of possibility for processes of *scaling* or *industrialization*: formats, in other words, are decisive factors that allow media processes, in the sense of physical or chemical processes, such as photographic or phonographic inscriptions, to grow into larger media systems, industries, and infrastructures with national, transnational, or even global commercialisation chains. Portrait photography, for example, only grew into a large-scale system of mass-production after French photographer André-Adolphe-Eugène Disdéri patented and codified his version of the "carte de visite" (*visiting card*), a 6 by 9 cm portrait photo paper format, in 1854 (McCauley 1985; Meyer 2008). Therefore, the study of formats can also be instructive for the historiography of media industries and infrastructures. Since formats embody whole sets of decisions and cultures of decision making, formats can also help us understand the terms and conditions and moreover, the imaginary futures, under which these industries and infrastructures evolved and operate.

IV. Conclusion

This article aimed to think about the "nature" and purpose of formats. In the first section, I briefly introduced some of the recent work on formats to highlight potential common interests in the topic, especially touching upon the relation of objects or artefacts to their surrounding environments and the infrastructures they are connected to or feed into. I also traced various meanings and uses of formats in the course of cultural history with the intention of producing a heuristic, albeit preliminary, typology of formats. Several common features and functions of formats I distilled from this typology helped me to make some suggestions about how to conceptualise them in theoretical terms. More specifically, I argued that due to the specific possibilities and affordances of formats to establish connections, relations, and labour chains, formats not only determine the aesthetic and individual experience of media content but also provide the terms and conditions for individual and distributed media practices and other forms of cooperation. My second argument intended to consider the consequences of this aspect with respect to matters of growth.

I do not intend to go so far as to claim that the notion of format is challenging to the notion of media as a foundational term in media studies. However, the category of the format may help sharpen the notion of media or the medium in a time of unprecedented media conversion, where media, as we knew them, are being dissolved in the universal medium of digital code. Formats render media into a concrete form, often determined by negotiated conventions. What Lisa Gitelman suggested as the need for more concise histories of media is therefore often concretely encapsulated in media formats: "It is better to specify telephones in 1890 in the rural United States, broadcast telephones in Budapest in the 1920s, or cellular, satellite, corded, and cordless landline telephones in North America at the beginning of the twenty-first century. Specificity is the key." (Gitelman 2006, 7 f.) Following Sterne, I would like to argue that a media theory, especially a media theory that

chooses to take infrastructural and media-ecological aspects of mediation into account, should consider the power of formats (Sterne 2012). A future *format theory* will not substitute for media theory, but it will likely prompt us to ask different questions, follow different routes, and write different histories.

The conception and application of formats emphatically reveals media as the arena where artefacts and practices intertwine and reciprocally generate each other. Formats embody practices just as they govern and support them. Therefore, format theory seems to be capable of transcending old debates in media theory regarding the technological or social determinism of media. Formats invite us to think about the specific formations of media (historically and geographically), how they relate to personal and collective work-practices and strategies of "infrastructuring" the everyday. Formats are always, in one way or the other, *mutually made* while, at the same time, their function of communicating potentially universal standards opens connections for new participants and collaborations and thereby affects and conditions *mutual making*. Once again, formats appear to be essential media of cooperation.

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