

ON BIOMEDICINE

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Naming the Subject

The designation "Biomedicine" as the name of the professional medicine of the West emphasizes the fact that this is a preeminently biological medicine. As such, it can be distinguished from the professional medicines of other cultures and, like them, its designation can be considered a proper noun and capitalized. The label Biomedicine was for these reasons conferred by Gaines and Hahn (1985) on what had variously been labeled "scientific medicine," "cosmopolitan medicine," "Western medicine," "allopathic medicine" and simply, "medicine" (Engel 1980; Kleinman 1980; Leslie 1976; Mishler 1981). "Medicine" as a label was particularly problematic: it effectively devalued the health care systems of other cultures as "non-medical," "ethnomedical," or merely "folk"--and thus inefficacious--systems based on "belief" rather than presumably certain medical "knowledge" (Good 1994). The term "allopathic" is still often employed as it designates the biomedical tradition of working "against pathology," wherein the treatment is meant to oppose or attack the disease as directly as possible. In contrast, "homeopathic" derives from the Greek *homoios*--"similar or like treatment"--and *pathos* (suffering, disease). In this model, medicines produce symptoms similar to the illnesses that they are intended to treat. Today, the designation Biomedicine is employed as a useful shorthand more or less ubiquitously in medical anthropology and other fields (though often it is not capitalized).

Early Studies of Biomedicine

Early studies of what we now call Biomedicine were primarily conducted by sociologists during the 1950s and 1960s (e.g., Goffman 1961; Strauss et al. 1964; Merton et al. 1957). Sociologists did not question the (cultural) nature of biomedical knowledge nor assess the cultural bases of medical social structures. Both were assumed to be scientific and beyond culture and locality. Rather, their central concerns were the sociological aspects of the profession such as social roles, socialization into the profession, and the impact of institutional ideology. With few exceptions (see Fox 1979), a lack of a comparative basis inhibited sociology from recognizing the cultural principles that form the basis for biomedical theory, research and clinical practice.

Biomedicine first came into the anthropological gaze as a product of studies that sought to consider professional medicines of other "Great Traditions" rather than the folk or "ethnomedicines" of traditional, small-scale cultures. Indian Ayurvedic (Leslie 1976), Japanese Kanpo (Lock 1980; Ohnuki-Tierney 1984) and Traditional Chinese Medicine (Kleinman 1980; Kleinman, et al., 1975) were objects of study in comparative frameworks that included Biomedicine. In these contexts, Biomedicine began to receive some scrutiny suggestive of its cultural construction, but this was not yet the primary focus of research.

Anthropology and Biomedicine

Early on, Biomedicine was *the* reality in terms of which other medical systems, professional or popular, were implicitly compared and evaluated. Like science, Western medicine was assumed to be

acultural--beyond the influence of culture--while all other medical systems were assumed to be so culturally biased that they had little or no scientific relevance (e.g., Foster and Anderson 1978; Hughes 1968; Prince 1964; Simons and Hughes 1985). Not only did this ideological hegemony devalue local systems, it also stripped the illness experience of its local semantic content and context (Early 1982; Good 1977; Kleinman 1980; 1988a). This stripping served to obscure the "thick" polysemous realities that became obvious in ethnographic and historical inquiries, challenging the "thin" biomedical interpretations of disorder (Early 1982; Good 1977; Ohnuki-Tierney 1984).

An appreciation of the diverse cultures of illness and of professional and folk medicines arose as Biomedicine itself came under a comparative scrutiny through the incorporation of symbolic and interpretive anthropology into medical anthropology. Interpretive perspectives were being applied in the fields of the anthropology of religion and psychological anthropology by people specializing in one (e.g., Margaret Lock, Nancy Sheper-Hughes) or both (e.g., Thomas Csordas, Atwood Gaines, Byron Good, Robert Hahn, Arthur Kleinman and Allan Young) (Gaines nd,a). During the 1980s, these two fields were enfolded within the expanding domain of medical anthropology because of their foci on (religious and ritual) healing and (ethno-)psychiatric and medical knowledge systems (Gaines n.d.a) (e.g. Good 1977; Early 1982; Edgerton 1966; Evans-Pritchard 1937; Jordan 1978; Levi-Strauss 1963a, 1963b; Middleton 1967; Prince 1964; Vogt 1976).

Anthropologists initially exploring Biomedicine met resistance both from fellow anthropologists, even medical anthropologists, and from their biomedical host-subjects. This resistance may have had a common source – "a blindness to a domain of one's own culture whose powers and prestige make it invisible to member participant observers" (Gaines and Hahn 1985). A major turning point in medical anthropology's consideration of Biomedicine was the publication of two largely interpretive works edited by Gaines and Hahn (1982; Hahn and Gaines 1985). These works "marked a new beginning in medical anthropology" (Good and Good 2000:380). They featured empirical studies of a variety of medical specialties, including psychiatry, internal medicine, family medicine, and surgery, as well as considerations of the conceptual models in medicine that guide and made sense of clinical practices. These works "legitimized anthropological work on North American and European biomedicine and launched wide-ranging studies of biomedicine by these authors and their students" (Good and Good 2000:380). They pointed to variations within biomedical praxis as well as to its ideological commonalities.

In these seminal works, Gaines and Hahn (1985) defined Biomedicine as a "sociocultural system," a complex cultural historical construction with a consistent set of internal beliefs, rules, and practices. Analyzing Biomedicine in this way enabled medical anthropologists to fruitfully cast their gaze on it from a relativistic perspective, (re)conceiving Biomedicine as "just another ethnomedical system," one that, like all others, reflects the values and norms of its creators.

This perspective has greatly facilitated the comparative study of Biomedicine vis-à-vis other medical systems because it challenges biomedicine's claims to the singular authority of truth and fact. Gaines and Hahn identified three features of Biomedicine as a sociocultural system: it is a domain of knowledge and practice; it evidences a division of labor and rules of and for action; and it has means by which it is both produced and altered (1985:5-6). These features are elaborated and extended here.

First, Biomedicine is a distinctive domain within a culture that features both specialized knowledge and distinct practices based on that knowledge (Gaines 1979;1982a,b; Lindenbaum and Lock 1993). In any medical system, a key factor is the relationship of medical knowledge to medical action (e.g., Gaines 1992d; Hahn and Gaines 1985; Kleinman 1980; Kuriyama 1992; Leslie and Young 1992; Lock 1980, 1993; Unschuld 1985). Action is made reasonable and is justified by belief in the form

of medical “knowledge”; in biomedicine’s biologically defined universe, only somatic interventions make sense (Good 1994).

Second, Biomedicine exhibits a hierarchical division of labor as well as guides or rules for action in its social and clinical encounters. The hierarchies of medicine are complicated and multiple. Some are based upon the nature of intervention: intensive somatic intervention is more highly prized, hence surgeons have more prestige and higher compensation than family doctors or psychiatrists (Johnson 1985). The treatment of women, children, and older people all carry less prestige in biomedicine, as well as usually lower compensation (Gaines 1992d; Hinze 1999). While such social structures are specific to Biomedicine’s domain, its fundamental principles, generative rules, and social identities mirror the discriminatory categories of the wider society in terms of gender and sexual identity (Hinze 1999; Ginsberg and Rapp 1995; Martin 1994) and ethnicity, social status, and age (Baer 1989, 2001; Gaines 1982a, 1986, 1992d, 1995a; Good 1993; Hahn 1992; Nuckolls 1998). For specific examples, we note that nurses, traditionally subordinate to physicians, have traditionally been women, and both women and members of ethnic minorities have had to struggle for access to biomedical treatment and education.

The focal subject of Biomedicine is the human body. The body so treated is a construct of Biomedical culture (Foucault 1975; Gaines 1992c), exhibiting the scars of specialty conflict as well as marks of the often invidious and discriminatory distinctions made in the wider society (Gaines and Hahn 1985; DelVecchio Good, Helman, Johnson, in Hahn and Gaines 1985). Through its discursive practices (Gaines 1992b), Biomedicine creates bodies as figures of speech in culturally specific ways. These form part of what Gaines (1992c, n.d.,b) names “Local Biologies.”

Third, as an internally cohesive system, Biomedicine reproduces itself through studies that confirm its already-established practices and, most salient, through apprenticeship learning--mentors tend to pass on to students what they are sure they already know. This self-reproduction is encapsulated in a term physicians themselves often use to refer to their knowledge system: “traditional medicine.” Yet all biomedical practitioners are taught, and tend to believe, that Biomedicine is science-based. In part, it is. As a consequence, the field also contains means by which it alters itself (e.g., medical research and its “advances,” practice and its presentation in medical journals and conferences, and concomitant alterations in what mentors “know”). Social scientists have shown that science itself is culturally constructed (Kuhn 1962; Rubinstein et al. 1984). Scientific traditions can be extremely resistant to change, yet the culture of science in general has shown itself to adapt more quickly to new information than the culture of biomedicine. Issues of “competence” (D. Good 1985; 1995) arise here because the scientific “standard of practice” can change abruptly with the reporting of new research findings, as in the cases of x-ray, thalidomide, cholesterol and, most recently, hormone replacement therapy. Often scientific evidence that challenges traditional medical practice takes decades to be incorporated (a phenomenon known as the “evidence-practice gap), whereas evidence that supports traditional assumptions is more likely to be quickly taken into account.

Biomedical Knowledge, Practice, and Worldview

Gaines refers to two discursive modes by which Biomedicine is learned, shared and transmitted: “embodied” and “disembodied” discourses (1992b). Through embodied person-to-person communication and through disembodied texts and images of various kinds, biomedical realities are (re)created over time. Both means have served to (re)produce popular as well as scientific knowledge. But it is noteworthy that science can and does recreate popular knowledge as scientific knowledge. For example, US Biomedicine continues to consider “race” to be a biological reality (Gaines 1995a). This Local Biology, reflected in scientific medical research and practice, has been augmented over the last

several decades by the misinterpretation of genetic research results—an unfortunate situation that has reinforced unfounded racial ideologies (Barkan 1992) and their eugenic overtones (Duster 1990).

The relatively recent emphasis on "evidence-based medicine" expresses many physicians' dawning realizations that much of their practice, in fact, has not been based on scientific evidence but on medical habits and tendencies, ingrained popular beliefs, and mentor-to-student traditions (e.g., radical mastectomies, low cholesterol diets, circumcision). Medical socialization explicitly and implicitly teaches professional assumptions about biological verities (Good 1994; Good and Good 1993) heavily influenced by a variety of sociocultural distinctions (Hinze 1999). These powerful formative processes of socialization (Good 1994) and those of medical practice employ an "empiricist theory of language" (Good and Good 1981) wherein what is named is believed to exist independently in the natural world. Nature, too, is believed to exist "out there," independent of the mind of the knower (Gordon 1988; Keller 1992).

Through naming and consequent diagnosis, medical language affects and effects transformations of culturally perceived reality. As Gaines and Hahn noted:

That the system of Biomedicine is a sociocultural system implies that Biomedicine is a collective representation of reality. To claim that Biomedicine is a representation is not to deny reality which is represented, which affects and is affected by what it represents. It is rather to emphasize a cultural distance, a transformation of reality; an ultimate reality cannot be known except by means of cultural symbol systems. Such systems are both models *of* and *for* reality and action [Geertz 1973]. Our representations of reality are taken to be reality though they are but transformations, refracted images of it (1985:6).

Biomedical representations of reality have been based from its inception on what Davis-Floyd and St. John (1998) call the "principle of separation": the notion that things are better understood in categories outside their context, divorced from related objects or persons. Biomedical thinking is generally ratiocinative, that is, it progresses logically from phenomenon to phenomenon, presupposing their separateness. Biomedicine separates mind from body, the individual from component parts, the disease into constituent elements, the treatment into measurable segments, the practice of medicine into multiple specialties, and patients from their social relationships and culture. This drive toward separation and classification can obscure the many meanings in the nonlinear, nonlogical relationships between and among entities.

Nevertheless, Biomedicine's atomistic trend continues to escalate. A few years ago, biomedical researchers were talking excitedly about a "paradigm shift" away from disease-causing organisms to genes. From an anthropological viewpoint, of course, this did not constitute a full ideological paradigm shift but rather an intensification of Biomedicine's separatist approach. Then in 2001, the Human Genome Project demonstrated that the human genome consists of only 30,000 genes. As a result, the once apparently vast field of genetic explanations of disease suddenly collapsed, and researchers have shifted their focus to proteins in the emerging field of "proteomics."

Biomedicine's separatist tendency results in part from its coming of age during the period of intense industrialization in the West, which led it to adopt the machine as its core metaphor for the human body. This metaphor underlies the biomedical view of body parts as distinct and replaceable, and encouraged the treatment of the patient as an object, the alienation of practitioner from patient, and the discursive labeling of patients as "the gallbladder in 112" or "the C-sec in 214." Patients were not expected to be active agents in their care (Alexander 1981, 1982); the physician was the technical expert in possession of the uniquely valued "authoritative knowledge" (Jordan 1993, 1997)—the knowledge that counts.

In the past few decades, the Western world has exported much of its industrial production to the Third World, where the process of industrialization continues apace. The West itself has transformed into a technocracy—a society organized around an ideology of technological progress (Davis-Floyd 1992). Thus Davis-Floyd and St. John (1998) describe Biomedicine's dominant paradigm as “the technocratic model of medicine”—a label meant to highlight its precise reflections of technocratic core values on generating cultural “progress” through the development of ever-more-sophisticated technologies and the global flow of information through cybernetic systems. Such developments have generated a new form of medical discourse in which patients themselves are often now expected to be conversant because of the wide availability on the Internet--the ultimate agent in the global flow of information--of even abstruse biomedical information.

Mary Jo Delvecchio Good (1995) has noted the dual emphasis on “competence and caring” that characterizes contemporary biomedical education in some locations. This emphasis reflects the growing valuation within Biomedicine of what Davis-Floyd and St. John (1998) have termed “the humanistic model of medicine”—a paradigm of care that stresses the importance of the practitioner-patient relationship as an essential ingredient of successful health care. This paradigm (previously also known as the “bio-psycho-social approach” (Engel 1980)) replaces the metaphor of the body-as-machine and the patient-as-object with a focus on “mind-body connection” and the patient as a relational subject. The “gallbladder in 112” becomes Mrs. Smith, mother of four, suffering from the stress of an unhappy marriage and the looming poverty that will result from her divorce. Kleinman's Illness Narratives (1988) has made many physicians more aware of the importance of listening to their patients and including their personal and sociocultural realities in diagnosis and treatment. This “conversation-based” approach is augmented by the “relationship-centered care” stressed by the Pew Health Foundation Commission Report (Tresolini, et al. 1994) and a new emphasis on “cultural competence” in biomedical training, to which many anthropologists have contributed (see Lostaunau and Sobo 1997).

Humanism was the central feature of the family practitioner until its near-obliteration by the splintering of Biomedicine into specialized fields that involved minimal practitioner-patient contact, which gained impetus during the 1960s and 1970s. Humanism's renaissance among contemporary physicians has led to the development of more patient-centered approaches to medical education such as the case-study method, in which students are taught through a focus on specific patients instead of a detached focus on disease categories.

Biomedical humanism reflects the technocracy's growing supervaluation of the individual (the “consumer” whose individual decisions affect corporate bottom lines), in contrast to industrial society's subsumption of the individual (the “cog-in-the-wheel”) to bureaucratic systems oblivious to individual needs and desires. Humanistic touches range from the superficial--e.g. the interior redecorating of many hospitals (a prettier and softer environment has been shown to positively influence patient outcomes)--to the deep, such as encouraging patients of ill newborns to hold them skin-to-skin (an effective therapeutic technique known as kangaroo care).

A third transnational paradigm, identified by Davis-Floyd and St. John (1998) as the “holistic model of medicine,” recognizes mind, body and spirit as a whole, and defines the body as an energy field in constant relation to other energy fields. Whereas humanistic reform efforts arose from within Biomedicine (at first largely driven by nurses), the holistic “revolution” has arisen since the 1970s largely from outside Biomedicine, driven by a wide variety of non-allopathic practitioners and consumer activism (Fox 1990). It increasingly incorporates elements of traditional and indigenous healing systems.

At present, a small percentage of physicians worldwide define themselves as "holistic," but in general, biomedical practitioners have been resistant to accepting other knowledge systems as valid, and continue to regard their own system as exclusively authoritative. Nevertheless, as the limits of Biomedicine (which cannot cure many common ailments) become increasingly evident, millions of people in the postmodern world continue to rely on, or are beginning to revalue, indigenous healing systems and to incorporate holistic or "alternative" modalities into their care.

Biology and Nature: Constructing Biomedicine's Ultimate Realities

The study of the clinical practices of Biomedicine has led to major observations about the realities with which it is concerned. Such research has demonstrated that professional medical systems represent a variety of biological realities, not one. Traditional Chinese medicine is very distinct from Biomedicine (Kleinman 1980; Unschuld 1985); its biological focus is complemented by a strong focus on energy. The same is true of Unnani, the professional medicine of the Middle East derived from Greek Classical medicine. Unnani and its Greek predecessor are involved in the somatic domain, but may add to it energetic and cosmological elements and interpretations that make their reading of human biology unique (Good and Good 1993).

A key formulation, then, is Gaines' notion of Local Biology, which sees biology as plural, as "biologies," all of which are products of historical moments that are culturally specific, reflecting the worldviews of their creators. Local biological constructions are ubiquitous in both folk and professional medicines of various cultures (Gaines 1987; 1992a, 1995). The concept of Local Biology transforms the putative acultural bedrock of Biomedicine into porous shale, reformulating the ultimate, allegedly universal reality (Mishler 1981; Engel 1980) into an ever-changing cultural construction. To Westerners, it has been clear that the professional and folk medicines of Japan, China, Tibet and India encompass very different biologies (Leslie 1976; Leslie and Young 1992; Kuriyama 1992; Lock 1980, 1993; Ohnuki-Tierney 1984; Unschuld 1985), but perhaps less obvious that French notions of the body and illness differ from those of the US or Germany, just as Germany's differs from those in the US and France (Gaines 1992c; DeVries, et al., 2001; Payer 1989). The term Local Biology highlights for us the fact that the professional and folk biologies of the world are specific to historical time and cultural place (e.g., Desai 1989; Gaines 1987, 1992c, 1995a; Kuriyama 1992; Lock 1993; Zimmerman 1987).

Central to the (re)conceptualizations of human biology in various societies are certain root metaphors: for "traditional" US medicine, the body is like a machine; in traditional Chinese medicine, it is like a plant; in Indian Ayurveda, the body is seen as an element in an ecological system. These analogies greatly affect medical nosologies, diagnostics and therapeutics. A cross-cultural vantage point makes it clear that biology is relative, not constant and universal in its normal or pathological states as Biomedicine asserts. Yet the thrust of Biomedicine remains the reduction of pathology to elementary, universal biological abnormalities that are believed to reside in "Nature" and can there be "discovered" (Keller 1992; Gordon 1988; Mishler 1981).

Anthropologists, historians, and philosophers of science, among others, have shown that nature too is a construction whose elements reflect our own cultural projections back to us (Foucault 1975; 1977; Davis-Floyd 1994; Gordon 1988; Keller 1992; Schiebinger 1993). Most cultural constructions of nature reflect cosmologies, and these cosmological underpinnings ensure the uniqueness of most medical systems, from Chinese medicine to local indigenous types of shamanism or witchcraft. Such underpinnings, especially in indigenous systems, are in fact what made them early candidates for anthropological investigation, allowing, as we noted above, the field of medical anthropology to grow rapidly by incorporating studies already carried out.

As we have seen, biomedical belief and praxis are as culturally constructed as any other medical system; they profoundly reflect the belief and value system--the worldview--of the postmodern technocracy. But this reflection is not made explicit in biomedical literature or teaching. Rather, Biomedicine purports to be belief- and value-free. Thus, it is one of the few medical systems in the world that does not ground itself in an overt cosmology connecting medical diagnosis and practice to a larger grand design. Through the anthropological lens we can see that biomedicine does in fact arise out of a cosmology, albeit an implicit and thoroughly secularized one. Its cosmological underpinnings are encompassed in what Davis-Floyd calls "the myth of technocratic transcendence": the hope-filled notion that through technological advances, we will ultimately transcend all limitations seemingly placed on us by biology and nature.

Moore and Myerhoff (1977) have pointed out that the less verbally explicit a group's cosmology, the more rituals that group will develop to enact and transmit its cosmology. Davis-Floyd (1992:8) has defined rituals as "patterned, repetitive, and symbolic enactments of cultural values and beliefs." Various anthropologists have shown Biomedicine to be heavily ritualized. The rituals of surgery not only serve instrumentally to prevent infection, but also enforce and display Biomedicine's attempts at maintaining the greatest possible distance from nature and its various organisms (Katz 1981;1998). Rituals of childbirth, such as electronic fetal monitoring, pitocin (synthetic oxytocin) augmentation, and episiotomy deconstruct this biological process into measurable and thus apparently controllable segments, reconstructing it as a process of technological production (Davis-Floyd 1992). The rituals of medical education construct it as an intensive rite of passage that limits critical thinking and produces practitioners heavily imbued with technocratic core values and beliefs (Davis-Floyd 1987; Davis-Floyd and St. John 1998:49-80; Konner 1987; Stein 1990). Rituals of communication reinforce biomedical hierarchies and the authoritative knowledge vested in physicians (Jordan 1993:70; Hinze 1999; Stein 1967), and maintain the discursive "realities" that Biomedicine creates (e.g. DiGiacomo 1987; Rapp 2001). These analyses of biomedical rituals bring us back to medical anthropology's early corpus of research--interpretive studies of the medical rituals of other cultures--revealing Biomedicine's reliance on ritual to be at least as heavy as that of traditional medicines.

Biomedical Realities: Constructing Diseases

Biomedicine's non-spiritual, non-religious biotechnical approach stems logically from its core metaphor of the body as machine, which is both grounded in and a result of biomedicine's secular (i.e. non-divine) worldview (Keller 1992). This focus leads biomedical practitioners to try to cure (to fix malfunctions), but not to heal (to effect long-term beneficial changes in the whole somatic-interpersonal system). Thus not only spiritual but also psychosocial issues are still often ignored, as are the multilevel semantic dimensions of clinical practice raised by anthropologists (Gaines 1992c; Good 1993). The "New Ethnopsychiatry" proposes that the incorporation of a variety of extra-clinical realities into clinical diagnosis and practice would provide for increased efficacy as well as healing (as opposed to curing) (Gaines 1992a).

George Devereux, a psychiatrically and psychoanalytically sophisticated theoretician, was a pioneer in the critical examination of Biomedicine (1944, 1949). Devereux was among the first to argue that a major disease category, schizophrenia, was probably a "culture-bound" disorder" (1980). He saw that the conceptualization of this illness was deeply influenced by Western local cultural beliefs and social practices that in turn shaped the forms, consequences and significance of the disorder(s). Subsequent work confirmed the cultural creation of this and other disorders such as depression which, after schizophrenia, is the most biologized mental disorder in the West (Gaines 1992a; Kleinman and Good 1985; Marsella 1980). Schizophrenia, assumed to be chronic because of its presumed biological basis, is not chronic in non-Western and underdeveloped countries and may not exist at all in some cultures (Blue and Gaines 1992; Devereux 1980; Kleinman 1988). The same problematic status of the

universality and character of depression has also been demonstrated (Kleinman and Good 1985). It was Devereux who coined the term “ethnopsychiatry”(1969), which later was used to subsume Western professional psychiatry (Gaines 1992a) as the accumulating evidence suggested strongly that mental disorders were indeed cultural constructions and showed wide cultural variation in categorization and social responses (Jenkins 1988; Kleinman 1988: Obeyesekere, Lutz, Schieffelin, in Kleinman and Good 1985; Nuckolls 1999).

Sociolinguistic and narrative studies of Biomedicine take discourse as a central topic in terms of education (Good 1994) and therapeutics (Mattingly 1999; Labov and Fanshel 1977). Biomedical communication patterns, physician silence, and aspects of a discourse of practitioner “error” have been investigated, as well as the discourse on medical “competence” (Bosk 1979; D. Good 1995; Paget 1982), and the logic and semantic load of patients’ discourse (Young 1995); (Kleinman 1988; Good 1994; Mattingly 1999). Physician discourse also serves to construct the patient not only as body part, but also in terms of social identity (e.g., implicative age, “race,” gender or gender categories). Such constructions have strong consequences for treatment (Gaines 1992c,d; Good 1993; Gordon and Paci 1997; Lindenbaum and Lock 1993); for example, physicians often create probabilistic scenarios about patients that guide diagnosis and treatment (e.g., “this 50 year old female patient with mood problems is probably going into menopause”) (Gaines 1992d; Good 1993).

Increasing anthropological awareness of the cultural construction of disorders and conditions in Biomedicine has angered feminist scholars, who have justly critiqued biomedical theory and practice for its patronizing pathologization of the female. Since its inception, Biomedicine has idealized the male body as the “prototype of the properly functioning body-machine” (Davis-Floyd 1992:51), and has defined the female body as dysfunctional insofar as it deviates from the male prototype (Fausto-Sterling 1992, 2000). Consequently, specifically female biological processes such as menstruation, pregnancy, childbirth, and menopause are pathologized and subjected to technological interventions (Ehrenreich and English 1973; Lock 1993; 1993; Martin 1987;1990; Rothman 1982, 1989).

New Trends in the Study of Biomedicine

The anthropology of reproduction is a relatively new subfield within medical anthropology. It comparatively explores both reproductive processes and their sociomedical treatment (for overviews, see Franklin and Davis-Floyd 2001; Ginsburg and Rapp 1991). It includes emerging anthropologies of menstruation (Buckley and Gottlieb 1987); childbirth (see Davis-Floyd and Sargent 1997); midwifery (see Davis-Floyd, Cosminsky, and Pigg 2001); and menopause (e.g. Lock 1993)—all of which have been intensely biomedicalized. Many of its latest works focus on Biomedicine’s new reproductive technologies (NRTs), which have expanded exponentially in recent years, from the birth of the world's first test-tube baby in 1978 to current attempts at human cloning.

The NRTs include, among others: (1) birth control technologies such as diaphragms, intra-uterine devices (IUDs), and “the pill”; (2) technologies of conception such as artificial insemination and in-vitro fertilization (IVF); (3) screening technologies such as ultrasound, amniocentesis, and blood testing; (4) reparative technologies such as fetal surgeries performed in utero; (5) labor and birth technologies such as electronic fetal monitoring, synthetic hormones for labor induction and augmentation, and multiple types of anesthesia; and (6) postnatal technologies like infant surgeries and NICU (Neonatal Intensive Care unit) infant care.

Like the early forceps developed by men for application to the bodies of women, which both saved babies' lives and caused major damage to their mothers, the NRTs have been fraught with contradiction and paradox, reflecting their embeddedness in the patriarchal culture that invented them. Their centrality to cultural issues surrounding women's bodies and women's rights has made them a

focal point for feminist and anthropological analysis from the early 1980s on. Some of these analyses have made their way into the heart of anthropological theory just as reproduction and kinship lie at the heart of social life. Salient among these is Ginsburg and Rapp's (1995) development of Shellee Colen's (1986) notion of "stratified reproduction." The concept encapsulates the myriad discriminatory hierarchies affecting women's reproductive choices and treatments. Indeed, as we have seen, Biomedicine itself is intensely stratified, as are its relationships to all other medical systems (Baer 1989, 2001; Hinze 1999).

A focus on Biomedicine also has led to the development of the study of medical technology and its implications for society (Lock, Young and Cambrosio 2000; Mitchell 2001) which now forms an important part of the developing field of Science and Technology Studies (STS), aka Cultural Studies of Science (CSS) (Gaines 1998b). This new field unites medical anthropology with historians and philosophers of science and medicine in new spaces of intellectual inquiry. Here we see studies of the sciences that Biomedicine applies, studies of scientific social organizations (e.g. Gaines 1998a; Gaines and Whitehouse 1998; Haraway 1991, 1997; Latour and Woolgar 1979; Lock 2002; Rabinow 1996; Young 1995), and clinical studies of new biomedical technologies (e.g. Cartwright 1998; Casper 1998; Cussins 1998; Mitchell 2001). CSS theorists recognize science as cultural enterprise and focus on scientific knowledge and its production and change; the label "Science and Technology Studies" (STS) more specifically reflects an emphasis on technology and its impact on society (Gaines 1998b). Here, Haraway's explication of the "cyborg," the ambiguous fusion of human and machine (1991), has served as a strong focal point for analysis (e.g. Davis-Floyd and Dumit 1998; Downey and Dumit 1997; Gray 1995).

The work of Michel Foucault (1975, 1977, 1978) has been formative for many anthropologists' understandings of Biomedicine, in particular his concept of biopower--the insight that control can be achieved by getting populations and individuals to internalize certain disciplinary procedures, which then do not have to be imposed from without. In many ways, this notion is a restatement of Freud's argument of the discontents of civilization and the development of the superego, but without a theory of the unconscious.

Theorists in Critical Medical Anthropology (CMA) have extended Foucault's concepts into the realm of political economy. For example, Schepher-Hughes and Lock demonstrated the value of viewing the body not only from individual/phenomenological and social/symbolic perspectives, but also as "the body politic" --"an artifact of social and political control" (1987:6). Other theorists in CMA have adapted work in political economy to analyze the development of biomedical hegemony and agency in tandem with political, institutional, and financial structures of control. These studies are generally not interpretive but rather offer traditional causal realist forms of analyses (Hacking 1983).

Exemplary here is Singer et al.'s (1998) study of "Juan Garcia's drinking problem," which analyzes one man's alcoholism in light of the US colonization and exploitation of Puerto Rico and the cultural discrimination against the immigrants who fled the resultant poverty to seek work in the US. Later, the farming out of factory production to cheaper Third World locations resulted in the closing of many American factories where such workers used to find employment. These authors show that the biomedical diagnosis and construction of Juan Garcia's "disease of alcoholism" limits cause to the individual, obscuring the effects of the sociopolitical and economic forces that curtailed his access to education and employment. This biomedicalization of alcoholism, as of many other conditions from pregnancy to malnutrition, likewise limits attempts at treatment to individual biology and tends to obscure extra-clinical factors.

In the US, disability has also traditionally been biomedically defined. But recent research in disability studies clearly shows its relativity in time and social space (both cultural and locational within

a culture) (Edgerton 1971; Frank 2000; Groce 1985; Ingstad and Whyte 1995; Langness and Levine 1986). For example, to be deaf within a community of the deaf is not a disability (Groce 1985). Many people defined by Biomedicine as disabled assert that they comprise a culture, not a "disability." New research continues to challenge limited biomedical definitions of dis/ability.

Bioethics constitutes an additional new area of anthropological research and practice. Since the 1970s anthropologists have been increasingly concerned with the ethics of biomedical practice, spurred by a variety of factors. These include patient activism, the declining sovereignty of Biomedicine, the resultant increase in biomedical susceptibility to lawsuits, and ethical lapses in experiments both during and after the World War II (Fox 1990). Bioethics constitutes both a area of theorizing and of practice: some anthropologists work as bioethicists or consultants who raise sociocultural issues (Carrese and Rhodes 1995; Marshall 1992); others study bioethics as a cultural phenomenon (Gaines and Juengst n.d.; Gordon 1999); and still others use ethics to critique biomedical theories (Gaines 1995).

The Stance of Practice

While all Biomedicines generate clinical practices, they differ significantly in their stances vis-à-vis disease and the patient. The foundational studies of Biomedicine in the 1980s showed that it is not unitary but rather consists of "many medicines" (Gaines and Hahn 1985). Within and across medical specialties, as well as across cultures, we find a variety of views all called Biomedicine (Hahn and Gaines 1985; Lock and Gordon 1988; Lührman 2000; Wright and Treacher 1982).

Nevertheless, as DelVecchio Good (1999b) and Davis-Floyd (2001) suggest, key characteristics of Biomedicine (such as its separation of mind and body, its mechanistic metaphors, its distancing style) tend to remain constant across cultures. Equally salient among these characteristics is aggressive intervention, most particularly in the US but also in many other countries. For example, throughout their history, US biomedical practitioners have aggressively treated many disorders without a trace of scientific basis, often to the detriment of the patient. The mercury and bloodletting of earlier times nowadays are replaced by massive over-prescription of drugs (one of the leading causes of death in the contemporary US) and the overuse of invasive tests and surgical interventions. The surgical maxim "when in doubt, cut it out" aptly expresses American biomedicine's aggressive focus. Here gender once again becomes salient: cesarean sections, hysterectomies, and (until recently) radical mastectomies have been among the most commonly performed of unnecessary surgeries in the US (see Katz 1985, 1998).

In contrast, French biomedicine has long been characterized by its non-interventive strategies; for example, it has minimized radical surgery, seeing it as too aggressive and too destructive of the body aesthetic (Payer 1989). Likewise, within American Biomedicine the "culture of medicine" (a term physicians use to refer to internal medicine), often conflicts with the "culture of surgery": internists tend to prefer a more patient, "wait and see" approach (Hahn 1985; Helman 1985).

Biomedicine's traditional aggressiveness has carried with it the promise of dramatic cures. This promise has become its Achilles heel as lawsuits proliferate when this promise is not fulfilled. The baby is not perfect, the surgery results in infection, the dialysis fails--it must have been someone's fault, as Biomedicine seemed to have promised all would be well. In general, biomedical practitioners justify their frequent use of aggressive interventions in historical terms, citing the drastic reductions in mortality that have resulted from early 20th century understandings of the etiology of infectious diseases and the discovery of antibiotic drugs. Their critics, however, can show that disease rates were already dropping in the industrialized world because of cleaner water and improvements in sewage treatment and nutrition. In the developing world, this argument continues (McKeown 1979).

Translating Biomedicine

Throughout the late 19th and 20th centuries, Biomedicine was massively exported into Third World countries. Sometimes it was borrowed and at others it was exported as a result of its colonialist imposition (Kleinman 1980; Lock 1993; Reynolds 1976; Weisberg and Long 1984). Still later, it was actively sought by developing countries as a feature of modernization.

The modernizing process acts as an homogenizing funnel that channels “development” toward univariate points: in economics, capitalism; in production, industrialization; in health care, biomedicine. The three work in tandem, as the importation of Biomedicine means the investment of huge sums of money in the construction of large hospitals (the factories of health care), the training of staff, and the incorporation of expensive medical technologies. Such modern biomedical facilities usually serve the colonizers and the middle and upper classes of colonized populations and are largely inaccessible to the majority of the population.

As in the West, major improvements in health for these biomedically underserved majorities have primarily resulted not from biomedicine but from public health initiatives to clean water and improve waste disposal and nutrition (McKeown 1979)--improvements that many Third World communities still sorely lack.

When Biomedicine is transplanted, it is altered in significant ways in terms of clinical practices, nosologies, medical theory, concepts of self and therapeutics (Farmer 1992; Feldman 1995; Gaines and Farmer 1976; Hershel 1992; Kleinman 1980; Reynolds 1976; Lock 1980; Weisberg and Long 1984). For example, pharmaceutical agents only available by physician prescription in the First World often take on a life of their own in Third World countries: traditional healers and midwives incorporate allopathic injections into their pharmacological repertoires; drugs are sold in pharmacies and on the streets without prescription. In a sense, people become their own diagnosticians and self-prescribe, without the biomedical establishment but also without a systematic way of dealing with the biological implications of their use of allopathic medicines (Van Der Geest and Whyte 1988; Nichter 1989).

Biomedicine’s inaccessibility and lack of cultural fit often ensure that practitioners in the developing world do not enjoy a monopoly on medical care; indigenous and professional healers from non-biomedical systems continue to serve large clienteles. In some areas, postmodernization is beginning to limit biomedicine’s reach, as literate and savvy non-biomedical healers, from shamans to curanderos to naturopaths, increasingly tap into and augment scientific evidence supporting the herbal, humanistic, and spiritual elements of their practices.

In all instances of culture contact, Biomedicine generally attempts to maintain its modern scientific status by coopting and redefining knowledge, therapies, or therapeutic agents found in other traditions, professional or popular. Medical dialogues are transformed into Biomedical monologues (Gaines and Hahn 1985). In this way, Biomedicine continually revitalizes itself and reinforces its hegemonic status by expanding to incorporate elements from other modalities.

In the cultural arena of childbirth, for example, core challenges to the intense medicalization of birth came from birth activists in the 1970s who demanded “natural childbirth” in the hospital, meaning in this case that women gave birth without drugs or technological interventions. By the 1980s, Biomedicine had humanized its approach to birth, redecorating delivery rooms, allowing the presence of family members and friends, and offering epidural analgesia so that women could be both pain-free and “awake and aware.” These humanistic reforms took the steam out of the natural childbirth movement by incorporating some of its recommendations. Yet at the same time, the technologization of birth increased: for example, the use of electronic fetal monitors has risen exponentially since the

1970s, as has the cesarean rate. Thus, Biomedicine reinforced its biopower over birth while at the same time allowing women a greater sense of agency and respect.

Analogously, pharmaceutical companies now move into indigenous areas, harvest local botanical specimens (often stealing them from local healers), sell them as vitamins or herbs, or mix them with drugs to create "nutraceuticals"; they then try to control the use of the ingredients they have taken, limiting or eliminating their availability to local populations. As with childbirth, this process of cooption continually revitalizes Biomedicine without giving status or credit to other medical systems and their distinctive ideologies of illness and healing.

Yet even in the West, Biomedicine does not hold a monopoly on healing. In Europe, homeopathic and naturopathic medicines are part of institutionalized health care systems, as are forms of hydrotherapy (Maretzki and Seidler 1985; Maretzki 1989; Payer 1989). In European, Canadian, and some American pharmacies, naturopathic and homeopathic medicines are sold alongside biomedical pharmaceuticals. In the US, Osteopathy and Chiropractic compete successfully in the professional health care arena (Coulehan 1985; Gevitz 1982; Oths 1992), as does professional Chinese medicine in the western states.

Around the world, the narrow funnel of modernization is opening to more expansive appreciations of what has been lost, what can be preserved or re-created, and what is still to be learned. It is increasingly clear that in the postmodern era, multiple medical knowledge systems can co-exist and come to complement each other. Biomedicine in all likelihood will continue to advance within its own parameters and to hold on to some status if not its earlier hegemony for decades to come. But, increasingly biomedical practitioners will have to respond to the existence and strengths of other ways to heal.

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