



FORUM 38: BODY AND TECHNOLOGY

Abstract: The issues of techniques and the body, corporeality and technology — whether in interaction with each other or treated as separate fields — have preoccupied scholars back to the origins of anthropology as a discipline. But bodies and techniques are less often addressed together. The aim of this issue of 'Forum' is to stimulate among anthropologists and cultural historians a discussion about precisely this 'knowledge gap', and to foster critiques of the interrelationship of corporeal and technological realities, including such areas as the mechanics of technology and its instrumentalisation of the body. This might include topics such as robotisation and 'cyborgisation', the expansion of human capacities with the aid of new technologies, the competition between human intelligence and IT, the technological dimensions of biopolitics and biopower, new cognitive techniques such as neurohacking, and the emergence of transhuman studies.

Keywords: new technologies, techniques, body, corporeality, anthropology.

To cite: 'Forum 38: Body and Technology', *Forum for Anthropology and Culture*, 2019, no. 15, pp. 11–82.

doi: 10.31250/1815-8927-2019-15-15-11-82

URL: <http://anthropologie.kunstkamera.ru/files/pdf/eng015/forum.pdf>

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Body and Technology:**

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Forum 38: Body and Technology

The issues of techniques and the body, corporeality and technology — whether in interaction with each other or treated as separate fields — have preoccupied scholars back to the origins of anthropology as a discipline. But bodies and techniques are less often addressed together. The aim of this issue of ‘Forum’ is to stimulate among anthropologists and cultural historians a discussion about precisely this ‘knowledge gap’, and to foster critiques of the interrelationship of corporeal and technological realities, including such areas as the mechanics of technology and its instrumentalisation of the body. This might include topics such as robotisation and ‘cyborgisation’, the expansion of human capacities with the aid of new technologies, the competition between human intelligence and IT, the technological dimensions of biopolitics and biopower, new cognitive techniques such as neurohacking, and the emergence of transhuman studies.

Keywords: new technologies, techniques, body, corporeality, anthropology.

EDITORS’ QUESTIONS

The issues of techniques and the body, corporeality and technology — whether interacting together in some way, or as separate research fields — have preoccupied scholars back to the origins of anthropology as a discipline. But bodies and techniques are less often addressed together (as in the classical discussions of the concept of ‘bodily techniques’ to be found in the work of Marcel Mauss and André Leroi-Gourhan). So what is the reason for the concentrated attention to this topic in contemporary anthropology? And in what ways is the discussion developing?

Until recently, medical anthropology, with its focus on the cultural construction of health management and illness, maintained a largely separate existence from the anthropology of bodily techniques and technologies, and it was only radical changes in contemporary biomedical practices that brought about the shared interest of those working in the different subdisciplines in striving for some kind of synthesis of the different disciplines. Alongside this comes the fact that our bodies have for long been imbricated in the functioning of sophisticated systems of techniques that ensure the survival of individuals and humanity generally. However, recently the pace of development of technological culture has begun substantially to overtake analysis of this process by the practitioners of the humanities and social sciences, anthropologists included. In turn,

the gap between the pace of development of knowledge and of technoreality is not only intellectually regrettable but may prove catastrophic.

Among the aims of the current 'Forum' is to stimulate discussion among anthropologists and cultural historians of precisely this 'knowledge gap' and to foster critiques of the interrelationship of corporeal and technological realities, including such areas as the mechanics of technology and its instrumentalisation of the body. This might include topics such as robotisation and cyberisation, the expansion of human capacities with the aid of new technologies, the competition between human intelligence and IT, the technological dimensions of biopolitics and biopower, new cognitive techniques such as neurohacking, and the emergence of transhuman studies.

We accordingly invited participants in the 'Forum' to address the following questions:

- 1 *What is the role of anthropology in the discussion of contemporary technologies and the impact of these on the human body? What is the relationship between anthropology and other disciplines in this area?*
- 2 *What are, in your view, the most promising approaches to the study of the body? Which most deserve discussion and implementation?*
- 3 *Which new problems and questions are raised for scholarly analysis (particularly in fields such as medical anthropology and the anthropology of consciousness) by new developments in the fields of biotechnology and the cognitive sciences?*
- 4 *How will the development of new technologies impact upon the future of anthropology and / or the humanities and social sciences generally?*

ELENA GUDOVA

**‘It’s Not an Easy Thing to Meet
Your Maker’: The Boundary
between the Human and the Non-Human
in Interactions with Robots**

I’ve seen things you people wouldn’t believe.
Attack ships on fire off the shoulder of Orion.
I watched C-beams glitter in the dark near the
Tannhäuser Gate. All those moments will be lost
in time like tears in rain. Time to die.

Blade Runner (1982)

In this monologue Roy Batty, the main antagonist and the leader of a group of fugitive replicants, relives moments from his life shortly before his death. He has just saved Rick Deckard, even though he was trying to kill him, thus demonstrating the slogan of the company that made him, ‘more human than human’. This is not the first time that science fiction, both in cinema and literature, has reacted more sensitively, and far more eloquently, to questions that have been occupying science during the same period. And, what is far from insignificant, science fiction has a better chance of bringing this agenda to the wider public.^{1,2} Many examples

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¹ E.g. an example of science fiction in the popular cinema has shown that from the 1970s to the present day the most important topics have been consciousness, identity, relationships (with humans), privacy and surveillance (in the Foucauldian sense), and also moral action [El Mesbahi 2015].

² Even though the data of the informational analytical review *Public Opinion Regarding the Development of Science and Technology in Russia [Obshchestvennoe mnenie... 2017]* indicate a slow but steady growth in interest in science on the part of the Russian population.

over the past five to seven years¹ deal not only with the progress of technology and artificial intelligence, but also with the nature of humanity and the interaction between the human and the non-human (the cyborg, the android, the robot) and its consequences.

This last has only recently become institutionalised as a distinct scholarly discipline of human-robot interaction (HRI) studying the particular features of communication between human beings and robots, and has certain ethical concepts about how this communication should be safe and friendly on both sides. Besides their practical implications, these aspects have profound philosophical roots.

In both Philip K. Dick's original anti-utopia and Ridley Scott's cinematic adaptation of it, the image of the future is the same: in a postapocalyptic world, humanity has created genetically modified replicants who are visually indistinguishable from people (they can only be identified by means of the Voight-Kampff empathy test) and whom it uses for work in extraterrestrial colonies. The replicants, in fact, are in the position of robot-servants with a determinate level of consciousness and intellect, and some of them have real people's memories implanted. All replicants have a limited 'service period', after which they are 'retired'. The key question for the whole story is whether humans can be distinguished from non-humans, and how. But there is another important question: whether such attempts to distinguish have any point to begin with.

The growing complexity of technoreality reveals the mismatch between our perceptions and our attitude to cyborgs. Both ethical and ontological distinctions are important here. Starting with the unattractive picture of *Blade Runner*, it seems useful to examine HRI from the position of the ontological turn in anthropology. If we follow the types of boundary between human and animal, organism and mechanism, and the physical and non-physical proposed by Donna Haraway [Haraway 1991], the distinction between human and robot ceases to be so clear-cut and entrains a whole series of intermediate categories.

I propose to examine their interconnection and the positions of anthropocentrism, perspectivalism and perspectivism relating to the question of human rights, on the basis of the material of observations made during the Thirty Years before Noon Laboratory, which took place in Moscow on 25–6 March and 1–2 April 2017. The ludic frame of the Laboratory, culminating in an 'Agora' on the recognition or non-recognition of the rights of a non-human being,

¹ Such as *Black Mirror* (2011–), *Her* (2013), *Transcendence* (2014), *Ex Machina* (2014), *Chappie* (2015), *Westworld* (2016–), *Ghost in the Shell* (2017), *Blade Runner 2049* (2017) and others.

was not only remarkably illustrative of the multiplicity of nature and culture, but also demonstrated the significance of the link between new (enfranchised) ontologies and the new ethics.

On boundaries

Anthropology has always been troubled by the boundaries of the human, and this has remained a central question for it, posing the problem of the relationship between the human and the ‘prehuman’ (animal or ‘savage’), and later between the human and the posthuman [Sokolovskiy 2013: 37]. The development of science and technology makes the drawing of this boundary ever more complicated, and also frequently equates transhumanism with posthumanism, which is not altogether correct: transhumanism supposes a technological (and biological) enhancement of the human being (assuming a hierarchy in development), whereas posthumanism is not exclusively focused on technology, and implies no hierarchies. On the contrary, posthumanism rejects the boundary between technology and the self and proposes relational and multilayered ways of thinking [Ferrando 2013: 30–2].

This posthumanist approach first obtained a relatively wide acceptance after Donna Haraway’s *A Cyborg Manifesto*. Criticising gender inequality, modern feminist theory, corporality and dualism in philosophy and social theory, Haraway proposes four interpretations of the cyborg concept: a cybernetic organism, a hybrid of machine and organism, a creature of lived social reality and a creature of fiction [Haraway 1991]. One of the ideas most important for her is that in fact the border of the cyborg is only an optical illusion (as we have all been cyborgs for a long time), and that any attempt to define it is a political act that will lead to border war.

A good example of this ‘border war’ is the question of enhancement, already alluded to in the subject field of bioethics. Modern medicine draws no clear distinction between enhancement and therapy, and this gives rise to ethical questions, for example the use of prostheses or performance-enhancing drugs in sport [Bostrom, Roache 2008: 125–8]. In order to speak of enhancement, one first has to determine what is normal in the organism’s capacities, and this shifts the ‘border discussion to an entirely different level [Soper 1999; Hogle 2005; Lapum et al. 2012]. In this sense bioethics is by its very nature more a normative and prescriptive than a descriptive science, and not even by taking into account the assumptions of cultural relativism can one solve the problem of the stigmatisation of ‘hybrid organisms’ [Kozhevnikova 2013].

Returning to the *Manifesto*, however, we should note that it is precisely the cyborg that is capable of blurring the borders. Haraway

identifies three of them: between human and animal, organism and mechanism and physical and non-physical [Haraway 2013: 150–2]. The first dichotomy concerns questions of anthropomorphism and animism.¹ Discussing the sociality of robots, Kathleen Richardson has introduced the term ‘technological animism’ to describe personhood in the interrelations between the human being and the humanoid robot [Richardson 2016]. If a robot is programmed to react on the basis of its perception of its environment, is capable of action, and even has personhood bestowed upon it, how much ‘humanity’ needs to be added before it appears to us as something (or someone) else? Or, to put it another way, how much (and what) can we change in a human being before (s)he ceases to be human? In a certain sense this is a new reading of the old philosophical problem of identity, the paradox of Theseus’s ship.²

Karen A. Cerulo defines five criteria by which the human is to be distinguished from the non-human in the social theory of human interaction:

1. Consciousness — the capacity to be aware of one’s actions and converse about them.³
2. Intention — the capacity to direct one’s actions in such a way as to influence a situation and maximise the achievement of goals.
3. Self-identification — the reflection that leads to an awareness of one’s own identity.
4. Orientation towards the Other — the capacity to take on a role, to assess the Other’s point of view (in some cases the interaction is reduced to an internal discussion with oneself).
5. Communication via language — the development of a common system of concepts and conceptual frameworks (norms, values) within the framework of interaction by means of language, and also signs, gestures and other symbolic forms [Cerulo 2009: 4–6].

For some theoretical traditions, such as interactionism and actor-network theory (ANT), it is more the capacity for action that is important than whether the subject is a human being. In ANT all the criteria of interaction enumerated above are inseparable from relations within the network, which makes the nature of subjectivity irrelevant [Cerulo 2009: 5]. The shift of focus from nature to action

¹ And likewise the relationship between object and subject, nature and culture and other distinctions that fall within the field of interest of object-oriented ontology or are analysed in the works of Philippe Descola.

² See, for example, the problem of identity over time in the Stanford Encyclopedia of Philosophy: <<https://plato.stanford.edu/entries/identity-time/>>.

³ Practically in Weber’s sense of ‘social action’, from the point of view of which even some human beings (those who are asleep, in a coma or in a state of exhaustion) are excluded from social interaction.

and relation connects the boundary between human and animal with that between organism and mechanism.¹

The distinction between an organism and a mechanism is based on the idea that machines are not autonomous, self-moving and self-designing. But, to the extent that machines acquire the capacity to move, we begin to wonder how far they are 'alive'. Another 'living' subject is connected with sociality. Various non-human beings may evoke emotional reactions in people and even the fantasy of reciprocity. The simplest examples of this are the once-popular Tamagotchi or Furby toys, which imitate the behaviour of a rational being, react to human presence, and make people want to look after them. Sherry Turkle has called such objects 'relational artefacts', made in such a way as to create the illusion of understanding and empathy in interaction with human beings [Turkle 2012]. In this situation projection (of thoughts and feelings) onto the object turns into engagement with the subject. Social robots are also relational artefacts that create the illusion of presence and understanding [Turkle 2007: 505–7]. This sort of sociality not only vivifies the objects, but humanises them as well.

At the same time, situations in which it is impossible to determine clearly whether we are faced with something living or lifeless (not necessarily only mechanical) produce an 'uncanny valley' effect [Wood 2002]. The more something resembles a human being externally, the more we are inclined to expect 'human' behaviour. Where there is a dissonance between external appearance and behaviour (for example, with zombies, corpses, Bunraku puppets, and also with anthropomorphic robots and cyborgs), we will experience antipathy and fear, and try to avoid any interaction, let alone seek empathy or understanding [Mori, MacDorman, Kageki 2012; Richardson 2016].

In a series of experiments, Gray and Wegner have discovered that the 'uncanny' effect is connected with robots' incapacity for acquiring sensory experience or feeling anything, and that it is experience (and not consciousness) that constitutes the fundamental difference between humans and machines. As they conclude, not without irony, 'we are happy to have robots that do things, but not feel things' [Gray, Wegner 2012: 129]. Replicants were very useful for carrying out tasks, but they had to fight for the right to feel and experience.

Haraway connects the distinction between the physical and non-physical with miniaturisation and the consequent increase in the

¹ Even office documents may have a conditional agency and act as mediators (see, for example: [Hull 2003]), but robots and cyborgs are in their actions nevertheless capable of a somewhat more evident influence on the course of events.

potential and capacities of machines.¹ The machines' seeming invisibility, their practical 'non-physicality', may be connected with their consciousness. If an individual capable of rational behaviour interacts with an object which for one reason or another has no consciousness, the thinking actor (i.e. the individual) 'does the mind' of the Other and carries out a symbolic 'ventriloquism' [Owens 2007: 577]. 'Doing the mind' of an Other is not the same thing as taking on its role, but rather the basic condition for a relationship with a (physical or non-physical) Other.

The cyborg's capacity for crossing boundaries means that it cannot be classified simply: it is both human and non-human, mechanical and non-mechanical, real and unreal [Richardson 2016: 123]. It is how we perceive this capacity and act in relation to it, or, more broadly, how we perceive the type of relationship in which the cyborg is included, that defines it as an entity. If it is no longer Theseus's ship, if cyborgs really are different from people (and we know where the boundary actually is), ought we to recognise their identity and perception? How can and should we act in this case? We are of course limited by the binary divisions mentioned above, since they may produce a deceptive impression of oppositions (and of a hierarchy that proceeds from them), but, as Strathern remarks, it is distinctions that keeps terms from dissipating [Strathern 2011a].

HRI and cyborg ontologies

When the human / animal, organism / mechanism and physical / non-physical boundaries break down, the focus is upon relationships.² The relational approach assumes that relations are inseparable from the actors involved in them. However, the variety of possible forms of relationship need not be reduced to complete relativism or exclude comparison. Strathern asserts that here it would be more correct and more useful to speak of analogies, since the actors exist in parallel positions and this allows the consequences of their actions to be correlated [Strathern 2011b]. The question of identity becomes a question of relationship: when we change the set of relations, we redefine the social role / status / position of the subject. In this sense Roy Batty was a human being, since his memories and experience created a network of human relations. There is, however, another question: whether the authenticity of these memories should influence his humanity (since in a replicant they are implanted).

¹ For example: 'People are nowhere near so fluid, being both material and opaque. Cyborgs are ether, quintessence' [Haraway 1991: 153].

² Among the attempts to make theoretical sense of the complex and multilayered interconnection of new technologies, enhanced biological nature and consciousness, without having recourse to relationships, we may list technosynchronicity [Cerulo, Ruane 1997; Cerulo 2009], biosociality [Rabinow 1992], the cognisphere [Hayles 2006; 2008], sociotechnical system [Pfaffenberg 1992], etc.

Non-hierarchical alliances and symbiotic attachments give rise to a new type of relations, 'becoming', which transforms types into events and objects into actions [Kirksey, Helmreich 2010: 546]. The framework of 'becoming' not only 'gives voice, agency and subjectivity' to the Other (any non-human being), visible in its differences, but also makes us radically rethink these categories of our analysis as they pertain to all beings [Ibid.: 563].

Voice, agency and subjectivity are connected by questions of perspective and representation, which is important when discussing cyborgs and robots. Otherness is nothing unexpected or questionable for anthropology, but there is a problem when we agree with a plurality of perspectives, which assumes a choice, and, consequently, antagonism. In this sense the divergence between perspectivalism and perspectivism is an important milestone in the development of the 'ontological turn' arising from the discussion around de Castro's *Cannibal Metaphysics*. The first of these proposes the singularity of the world and a plurality of viewpoints, and the second a plurality of worlds and the possibility of taking only one point of view [Kapferer 2011; Strathern 2011a; Paleček, Risjord 2013].

At present HRI is concentrating on artificial intelligence and social robotics, but questions of the perception and behaviour of robots are also being examined [Capurro, Nagenborg 2009; Gunkel 2012; de Graaf 2016]. The capacity of mechanisms to take ethical decisions in complex situations has already passed from the subject of philosophical discussions (or at least Asimov's 'three laws of robotics') into the category of practical tasks.¹ However, both machine ethics (which deals with the moral behaviour of agents with artificial intelligence) and robot ethics (which is connected with the moral behaviour of people in relation to them) are founded on the expected anthropocentrism and the distinction between the human and the non-human. It is obvious that progress in the field of machine learning and programming will permit the taking of decisions to be entrusted, perhaps even delegated, to cyborgs and robots. But where ethics is concerned this raises a mass of questions: ought we to allow non-human subjects the possibility of taking ethical decisions? How can we supervise them? Should we do so? Who will be responsible for the decisions taken? But the main question is a much more complex one: should our own categories of morality extend and apply to cyborgs at all?

¹ This, for example, concerns driverless cars, accidents involving which evoke an extensive response, from discussions about the safety and reliability of this form of transport to the installation of a deontological / utilitarian ethical module. See, for example: <<https://www.scientificamerican.com/article/what-the-first-driverless-car-fatality-means-for-self-driving-tech/>>, <<https://www.technologyreview.com/s/542626/why-self-driving-cars-must-be-programmed-to-kill/>>.

Eduardo Kohn has proposed that ‘[a]ll good anthropology has always been ontological in that it opens us to other kinds of realities. And it has also always been political’ [Kohn 2014]. An antagonism between the existing perspectives of the human and non-human does not presuppose equality, and therefore replicants, even if they are ‘more human than human’, need to be got rid of.

The political aspect of HRI is further complicated by the distinction between cyborgs or robots and the status of artificial intelligence. Whom can we recognise as the Other? It seems obvious that even a very high-tech office printer is different from Neil Harbisson, who had a special antenna implanted in his skull to overcome his colour-blindness (because of congenital achromatopsia he could only see in shades of grey), not least because of the importance of their outward appearance¹ [Coeckelbergh 2011: 198]. But how different should robots and cyborgs be for us to recognise them as subjects with their own ontologies, and not as objects in our own perspective? I have demonstrated a few thoughts and an empirical illustration on the basis of an analysis of material from the Thirty Years before Noon Laboratory.²

From cyborg ontologies to cyborg rights

The Thirty Years before Noon Laboratory’s object was ‘to develop humanitarian initiatives directed towards work with new technologies with the aim of forming the desired image of the future’.³ The ‘Noon Universe’ invented by the Strugatsky brothers was used as a framework for the game: the participants were being prepared for a journey to the planet Saraksh⁴ thirty years before the events described in the novel *Prisoners of Power*, so that, as ‘progressors’,⁵ they should determine the desired future on Saraksh and the steps to be taken to achieve it. Over four days the participants worked out the theoretical concepts and ideas, thought out the stages of technological development for the next five, ten and twenty years, engaged in the search for the essential basic values in the newly built world, and modelled the situation of contact with the planet’s inhabitants. Although any of the Laboratory’s events could be of interest to anthropology, I shall concentrate on the development of general ‘progressor’ values based on Buckminster

¹ But here we should also remember the ‘uncanny valley’.

² <<http://futuref.org/lab12>>.

³ Quoted from the description on the project’s official website.

⁴ The setting for the events of the novel *Prisoners of Power*. The Laboratory premise was that in all areas of life the situation on the planet was identical with the current situation on Earth, i.e. in practice Saraksh was a projection of it.

⁵ Representatives of developed races engaged in the technological and social development of civilisations that are at an earlier stage.

Fuller's 'World Game'¹ and Georgy Shchedrovitsky's organisational activity games.²

The game itself was developed by the team of organisers, but, besides, it has quite complicated rules, so I shall omit any detailed description of the subject and just give the character of the design. Nearly forty players³ in teams of three had, over several rounds, to solve various problems: first to form a world government and define its powers, and then to model how this government would cope with crisis points in the life of the planet's inhabitants (for example, the explosive growth of nanotechnology or artificial intelligence).

How successfully each problem was solved depended on the values affirmed by the world government. How, for example, should humanity react to its first contact with an extra-terrestrial civilisation — by showing trust, reflection and attention, or mistrust, alienation and aggression? The teams offered their sets of three values for the solution of each successive problem, and their influence on the final decision might have a different force (from weak to strong) and effect (good, bad or indifferent). For each new problem the masters changed the composition of the teams.

In the final round, after passing through all the crisis points, the participants were invited to assemble in the 'Agora' and discuss the final question: should the non-human be accorded human rights? A 'Being' (as the organisers called him) addressed the participants with Andrew's speech from the film *Bicentennial Man*, asking the inhabitants of the planet to grant him human rights, so that he (the Being self-identified as masculine) could marry his beloved.

The participants had to give a single decision as the outcome of a general discussion, and for further discussion three organisers, who had prepared for the round in advance, offered possible decisions:⁴

1. To agree, and recognise the Being as equal to a human being, and with equal rights.

¹ <<https://www.bfi.org/about-fuller/big-ideas/world-game>>.

² It should be noted that the description and interpretation are based on participant observation and my role as a participant, which introduces certain specific features. There was no original intention to conduct observation, so the following thoughts might be better called reflection or (at the very least) autoethnography. However, as observation should, it gives a much fuller idea of the dynamics of the relations between participants, the game setting and activity of the masters, and communication within and between teams.

³ They were participants in the Laboratory, quite diverse in both in their sociodemographic character and in their interests. In the game, the teams were supposed to fulfil their tasks and compete with the other teams for the opportunity to influence collective decisions and the actions of the world government.

⁴ These are certainly hyperbolic and schematic. However, as the organisers themselves said, this was a deliberate experiment, to give the participants the freedom to accept what had been offered or to work out any other variant.

2. To remain neutral and require further investigations (how far the Being resembles a human, how much he loves his intended, and so on).

3. To refuse the request and banish the Being.

The 'Agora' began with three simultaneous discussions: the organisers, acting as leaders, each tried to win the players over to his / her side, while the players were free to move about and take part in any of the discussions. The 'refuse' group discussed the existential risks and malevolence of artificial intelligence, and the loss of humanity and exclusivity. The 'neutrals' argued about subjectivity and the insufficiency of knowledge for such an important decision. The 'accept' group was touched by the Being's emotional address and declared that since he was capable of feeling and pro-social, he should be recognised as equal to human beings (which involves the organism / mechanism boundary discussed above).

Since the 'neutral' and 'accept' groups had attracted an equal number of participants, the 'Agora' was extended for a second round. Here the most important transition was made: a new group formed to declare that the very concept of 'human rights' was outdated and did not reflect present realities. We should instead speak of the 'rights of living beings'. (This will now be referred to as the RLB group.)

At the same time the 'accept' group divided into two subgroups: one continued to support recognising the Being's humanity and consequent rights (the H group), while the other asserted that acknowledging someone's other nature was not equivalent to granting equal rights (the R group). To avoid further detailed description of the dynamics of the game, I shall confine myself to saying that in the end it was the RLB group that got the most votes. The Being received rights of living beings, but it was not said with any clarity whether he was now able to marry a human woman.

This is quite an illustrative example from the point of view of cyborg ontologies. As a first step, the participants effectively confirmed that a subject's humanity is often constructed on our perceptions of the subject's ability to elicit empathy and demonstrate sociality [Turkle 2007; Cerulo 2009; Richardson 2016]. This is why the instigator of the 'refuse' group hardly attracted any adherents at all, apart from a couple of tricksters who were testing the game's robustness.

Nevertheless, the fact that in the first part of the 'Agora' the votes were divided between neutrality and acceptance shows that there are boundaries, and that they are quite rigorous. How human did the Being have to be to be recognised as equal to humans? And should the players for this reason grant him equal rights with humans? The R group was generous in its acknowledgment of otherness, but had not moved far from anthropocentrism: the

Being was no different in appearance from a human being, was capable of fellow-feeling, of behaving and thinking like a human being, so why should he not be acknowledged? This decision is also a direct consequence of the hierarchical way of thinking: the non-human may be equal to the human, but the political decision about it remains with the latter.

The RLB group avoided a 'boundary war' over the nature of the cyborg [Haraway 1991] and recognised all beings' rights, stressing that humans are not alone in this world (which has been said amongst anthropologists for a very long time and by very many people). The RLB group based its argument on the viability and consciousness of living beings, taking cetaceans as its starting-point.¹ There are many beings, and, therefore, many perceptions of the world, and there should be no hierarchy amongst them, which is similar to the ideas of perspectivalism.

The separation of rights and nature in the H and R groups in the second round of the 'Agora' is in my view connected with the difference between perspectivalism and perspectivism. An acknowledgment of the subject is not the same as an acknowledgment of his / her capacity to act within the framework of a particular set of relations or to form a new one. In order to recognise another nature and grant it equal rights, it is necessary to recognise multiplicity [Strathern 2011a]. An acknowledgment of a multiple nature and an affirmation of the same rights allows the human to be distinguished from the non-human through their connection, since it focuses on differences and not on similarities.

It is important to note that in each part of the 'Agora' the discussion touched on questions of the 'universal' nature and 'multiple' culture of humans and non-humans (on the example of the Being). This cultivation of multiculturalism and multinaturalism [Kohn 2015] introduces an additional theoretical complication for understanding the Other. De Castro, of course, spoke of Amerindian groups, and not of potential interaction between humans and robots. Nevertheless, this instance does illustrate the boundaries between perspectivalism and perspectivism and allows us to speak not only of new ontologies, but also of new ethics.

Conclusion

I have attempted to ask the question whether, and how, one can draw a line between the human and the non-human in human-robot interaction. The evolution of technologies and biological enhancement is widening the gap between what we think and feel regarding cyborgs and how we behave in relation to them. The boundaries

¹ <<http://www.cetaceanrights.org>>.

between human and animal, organism and mechanism, and physical and non-physical examined by Donna Haraway may become a political question in a symbolic 'border war', and this war also shows how strong the foundations of perspectivalism are at present.

Using the example of the Thirty Years before Noon Laboratory, I have described and compared the positions of anthropocentrism, perspectivalism and perspectivism in the question of 'human rights'. It may seem that the ludic setting of the Laboratory again demonstrates only a 'human' point of view, since after his address the Being was not given any opportunity to influence the progress of the discussion or the decision about his future. But, despite all the shortcomings of its modelling, this situation is close to reality, when other species (or those to whom the designation and status of human is not fully accorded) are deprived of the opportunity to fight for their rights (or nature). Roy Batty was a 'replicant', and even this designation placed him from the beginning on a lower rung of the hierarchy of species. Was he 'more human than human', as the company asserted? Perhaps. But an advertising slogan is only one more value judgment, entirely open to interpretation.

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ASYA KARASEVA

When I received the invitation to take part first in the thematic selection, and then in the discussion on the topic announced, I was at a loss. My participation in the relevant section of the 2017 Congress of Anthropologists and Ethnologists had been almost by accident: it was determined by my field material, to which the focus on the body was highly suited, even though from the point of view of the subject of my dissertation it was subsidiary. I digested a certain amount of the literature, but even so did not feel myself sufficiently competent to answer the questions as an expert. The explanation for this is to be found not only in the author's insurmountable perfectionism

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or false modesty, but in the very status of the body and corporeality in anthropology: until the 1990s it hardly appeared as an independent research subject, but it had served as a lens for analysing other topics almost since the discipline had come into being. (Sociologists, however, had even worse luck: there the body was absent even as a means of analysis [Bendelow, Williams 2002: 10].) This special status of corporeality — ‘an absent presence’ — is often stressed in the work of social scientists of either research area [Martin 1992; Lock 1993; Bendelow, Williams 2002; Shilling 2012].

What is the body? The answer to this question in general determines the methodology, at least within the limits of a particular article. Collections that contain different approaches to the body and corporeality [Featherstone, Hepworth, Turner 1991; Csordas 1994; Kabakova, Kont 2005; Shilling 2012] are eclectic, which underlines the diversity of possible meanings of ‘the body’.

The multiplicity of meanings of ‘the body’ allows great freedom to researchers in choosing both their topics and the material for analysis, allowing them to include in their research not only the image of the body as a whole or of particular parts of it, but also emotions, affects and sensory perceptions. Researchers interested in the topic regard this property of ‘the body’ as something of an advantage [Lock 1993], and some authors deliberately practise eclecticism as a method [Wolputte 2004].

These general remarks concern the approach of the social sciences in general. To identify the specifics of the anthropology of the body (in the broad sense), it is interesting to compare it with its sister discipline, the sociology of the body. Sociologists are much more ready than anthropologists to publish collections of articles on the topic, with the aim (in my opinion, unsuccessfully) of systematising the possible approaches to the body: half of the collections mentioned above are on the sociology of the body, and one of them, *The Body and Social Theory*, edited by Chris Shilling [Shilling 2012] has already gone through three editions and seven printings. Thematically, sociologists more often analyse the realisation of social control over the body — corporal pedagogy, including PE lessons and sports practice, the body through the prism of consumption. Norbert Elias, Michel Foucault, and Pierre Bourdieu are popular theorists. (It should be noticed that Elias’s approach makes the inclusion of emotions in research on the body much less problematical for sociologists than it is for anthropologists.)

By contrast, anthropologists for the most part publish surveys in the *Annual Review of Anthropology*: there have been fourteen reviews¹

¹ Counting those which have the word ‘body’ in the title.

from 1993 to 2017 (the modal years are 2004 and 2005). The only anthropological book that brings together various theories of the body that I have managed to find is the anthology edited by Margaret Lock and Judith Farquhar [Lock, Farquhar 2007], which combines classical and contemporary texts and the structure of which well reflects the interests and viewpoints of the discipline: colonialism, capitalism, gender, everyday life, the production of knowledge. One may only add the topics of the symbolic connection between the body and society and the representational functions of the body, which were not included in this anthology. The problems of gender and the status of the female body are a common topic for sociologists and anthropologists.

It is noteworthy that neither of them, however, seem to examine the evolution of modern technologies — at least, there are no articles on this subject either in the collections or in the surveys of the *Annual Review of Anthropology*, if one does not count the rather old survey by Linda Hogle [Hogle 2005], and even Donna Haraway is somewhat infrequently mentioned. Articles on this subject, as far as one can judge, are placed in specialised publications devoted to research on science and technology or the social aspects of medicine. Technologies prove to be a real blind spot in research on corporeality.

In her insightful essay ‘The End of the Body?’, Emily Martin cites Lévi-Strauss: is not an intensification of academic interest in a subject a sign that the subject is an ‘endangered species’? The discovery of the fragmented, incomplete body is often presented as an achievement of the social sciences, but it can hardly be regarded as such, if in order to see the body beyond the bounds of the body, it must first be imagined as a whole detached from its environment. Martin’s research shows that biological knowledge of the body is directly connected to the technological organisation of society: in a Fordist production society the female body was represented as a reproductive machine, while the society of the period of late capitalism, where, thanks to new communication technologies, time is accelerating, space is shrinking, change is becoming constant, and flexibility and adaptability are becoming social values, gave rise to immunology with its concept of the organism as a whole [Martin 1992]. The imagination of the body as a whole is thus only just taking shape for researchers, to a large extent thanks to technologies, some new, and some to which we are well accustomed, and the significance of which for this process remains to be revealed.

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MAGDALENA KOZHEVNIKOVA

Posthumanism / Postanthropology: The Value of the Biological Body

There are two tendencies in collision in the humanities today, each of which has its own view of the problem of human corporeality. I have in mind posthumanism and transhumanism. While the first is inspired by biology, the second is rooted in the world of technology. In spite of certain similarities (the greatest of which is dissatisfaction with the condition of modern man and the goal of changing his / her status) there is a great difference between these tendencies. The transhumanists, it seems to me, are more conservative in their approach. Continuing the tradition of the Enlightenment, they aim for progress, intellectual development, and an escape from the limitations imposed on us by the biological body. Posthumanism, on the other hand, is effecting a real revolution in thought about humanity and its position in the world: it is discarding anthropocentrism and

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the idea that humanity has a privileged position over other living beings. This tendency, which is becoming ever more widespread in the humanities, is the one on which I would like to concentrate. Its influence on anthropology may seem somewhat paradoxical when the very name of the latter discipline indicates that humanity is at the centre of its interests. Nevertheless it is worth considering whether anthropology can study non-human subjects, such as animals and plants, in the same way in which it sometimes studies other cultures — looking at them from a distance, without engaging with them in a common language (be it verbal or symbolic). Can non-human subjects become the classic Other for postanthropology?

Posthumanism has been evolving since the 1970s. The first to use the term was the literary theorist Ihab Hassan, who asserted that the idea of the human being needed rethinking. All culture founded on anthropocentrism began to be subject to revision. Moreover, it began to be said that there could be no further development of the humanities that did not take account of the most recent achievements of the natural sciences. A lot of people point out that it was the 'revolution in biology' that gave rise to the 'posthumanist revolution'; since the middle of the twentieth century there have been many discoveries, such as the molecular level of life, the structure of DNA, and progress in genetics and neuroscience has shone a new light on many human characteristics. Everything 'human', including culture, has proved to be a product of evolution. The difference between human beings and the rest of the living world ceased to be perceived as a difference in quality, and became only a difference of level. This is followed by a gradual expansion (still new and unaccustomed in Russia) of the concept of the subject to include so-called non-human subjects or non-human persons: animals, cyborgs, hybrids, robots and artificial intelligence.

In this context it is no less interesting how the perception of the human body is changing, particularly if one compares the points of view of the transhumanists and posthumanists. The transhumanists, who remain profoundly anthropocentric, continue the age-old tradition with its Judaeo-Christian roots, typical of Western culture, of thinking of the human body as a punishment, a prison, a restriction on the development of the 'real' human being, who is buried deep inside the body and who can only be freed by being released from this burden. For the transhumanists biology is a liability and a negative experience that needs to be overcome. The human being of the future will be a virtual human, liberated from corporeality, i.e. from disease, ageing and death.

The posthumanists, by contrast, see value in the biological body. First of all, one should note the very great influence of the biological sciences on posthumanism. Awareness of horizontal gene transfer

and the evolved microbiota of bodies forces us to repeat, after Donna Haraway, that ‘we have never been human’. Indeed, it is impossible to draw a line between what is ‘human’ in our bodies and what is not. In this way, ‘nasze jednostkowe bycie w świecie faktycznie oznacza bycie wielogatunkową wspólnotą uczestniczącą w kluczowym procesie nieustannej wymiany [our individual existence in the world actually signifies existence as part of a community of multiple species participating in a crucial process of constant exchange],’ remarks Monika Bakke [Bakke 2015: 94]. All living organisms — bacteria and viruses, fungi and microscopic animals — are full participants in our life, which loses its individual character. Bakke proposes conceptualising the human body as a ‘superorganism’, and the actual human more as householder than as predator.

However, to these thoughts of the posthumanists about the crossover of various life-forms we may add the new hybrid reality connected with the development of technology. In fact, the idea of the body as a ‘superorganism’ would have been impossible without the discoveries made with the help of technology. The most recent technologies help us to take another step forward, not only observing the crossover between life-forms, but also creating it. I have in mind the area of the hybridisation and chimaerisation of different organisms, including humans. Crossing the living with the non-living, humans with animals, robots with plants — in the twenty-first century a new ‘inter-species’ reality has emerged which, as it changes living organisms, forces us to discard our accustomed classification of species: transgenic animals and plants, animal chimaeras with the organs of other species, cyborg insects, robots with isolated living brains or growing together with plants. Such organisms are not only being created in laboratories: hybrid organisms may be seen at bio-art exhibitions, and transgenic products bought at supermarkets. It is justifiable to assert that the development of biology and biotechnology has led to the phenomenon of crossing species boundaries, and this affects the social and philosophical sciences, including anthropology, because human beings are also involved in ‘interspeciation’.

In my opinion, the gradual transformation of species, like the hybridisation of human bodies, is one factor that leads us to accept extra-species ethics. Another such factor is the increase in our knowledge of the cognitive faculties of animals and their capacity for both negative and positive experience, that is, an emotionally rich life like ours with room for the anticipation of the good and the avoidance of the bad. Animal ethics takes all this into account, but extra-species ethics is something more than the struggle for animal rights and thinking of them as subjects. The foundation of extra-species ethics is non-anthropocentrism. Non-anthropocentrism arises in turn, as we have already said, from an appreciation that the

difference between human beings and the rest of the living world is less significant than we thought even a few decades ago. One of the chief aspects of the commonality of all living things is the common experience of all corporeal beings of 'being in the world'. 'All life is incorporated,' remarks Bakke. All life derives pleasure and suffers from its corporeality. This experience has allowed us to set about expanding ethics to include other living (i.e. corporeal) beings. If we achieve the revolution to which the transhumanists aspire and become virtual beings, if we discard our corporeality, then in all probability we shall fall back into anthropocentrism, or more likely into a new form of it, since the new bodiless human will not be the same sort of human being. I dare say that a better understanding of our biological bodies would allow us to expand our ethics in a more logical and coherent manner, while the lack of a biological body would result in ethical regression.

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VICTOR KRUTKIN

Human Corporeality and the Technologies of 'Light Writing'

1. *The body in the world of artefacts*

A human being experiences the effects not only of the forces of nature, but also of factors that (s)he himself / herself has produced. More than a century and a half has passed since artificial images of the photographic type were invented, and people have been surrounded by them ever since. Sometimes they surround people like fog or rain, sometimes like a clinging spider's web, and frequently they inspire images of happiness and clarity. The time is past when this medium was associated with a window into the world of 'historic truth', but this does not diminish our interest in 'light writing', as is proved by the multitude of scholarly conferences on the subject. In 2014 a new periodical, *Anthropology and Photography*, began to come out in London.

Questions of the connection between technology and human beings are often discussed in the context of the social sciences' turn towards materiality and corporeality. Daniel Miller provides a new meaning for Hegel's concept of 'objectification' [Miller 1987: 19–82]. In order to realise and understand itself, the subject creates (alienates or objectifies) an object and externalises it in material or ideal form. Representations of this kind may use various vectors — visible figurative forms, audible sonic rhythms, kinaesthetically palpable bodily motions, impressions of taste or smell. Such an object is apprehended or acquired by the subject, and both parties are changed in this process of production and consumption. The dialectic of subject and object consists in the subject's becoming its own object and returning to itself at another level, and this continues cyclically, as each objectification brings about a new modification of the subject. An important aspect of this is the particular connection of the parties: the subject is never the subject per se, but is always defined by its relationship to the object. a culture has no subject, neither in the image of a particular person nor in society as a whole, because the subject should be considered as both the creator and the creation of the culture.

The materiality of artefacts is a characteristic of objects in their effect on each other and on human beings. People organise the world through their artefacts, and by this very process human beings are organised. Does society consist of people (together with their activities, institutions and ideas) or should the objects arising in the course of their activities also be included in the social world? And if objects are to be allowed into the social reality, how are they to be interpreted — as symbols of social relations (signs) or as things endowed with independent activity? The material turn is connected with the recognition that objects are not just signs and that not only people are active. People organise objects, and find themselves organised by them, and there emerges in people's behaviour what Miller calls 'the humility of things'. 'In a sense artefacts have a certain "humility" in that they are reticent about revealing their power to determine what is socially conceivable' [Miller 1994: 409]. Artefacts form a wider field than the signs of language.

Materiality is not an original characteristic of objects, historically it is formed in objectifications. Materiality and substantiality are identified in popular discourse, but they are not the same thing. 'Substantiality' is a question of the thresholds of our perceptions. Objectification is a movement to mediate the unmediated. But in reality people encounter not only that which bears the imprint of media, but also that which is unmediated, that which continues to live its own life in objects.

Materiality is a product of becoming, it is a product of the materialisation of the immaterial. As a term, 'immaterial' is preferable

to the negative 'non-material'. 'The immaterial' is not anti-materiality, it is an expression of the presence of 'another materiality', whereas the 'non-material' only embodies the idea of an absence of qualities. For example, people might use the expression 'a non-alcoholic drink', but in this case they are, precisely, saying what there is not in the drink, and not saying what there is — water, sugar, vitamins, salts, etc.

Materiality itself is many-layered, and research into the technologies of sociocultural objectification shows that the division of culture into material and non-material (substantial and palpable, on the one hand, and insubstantial and impalpable on the other) leads us up the blind alley of dualistic oppositions. This can be avoided if we learn to speak of the materiality of 'non-material' culture, discover its origin as that of artefacts on the whole. As Marshall McLuhan remarked, there are palpable things, 'hardware', such as bats and balls, knives and forks, railways, space ships, radios and computers. There are impalpable things, 'software', such as theories and scientific laws, philosophical systems, forms and styles of painting, poetry, music, etc. 'All are equally artefacts, all equally human, all equally susceptible to analysis,' and we must be prepared for all our accustomed distinctions between sciences and arts, things and ideas, physics and metaphysics to lose their former rigour [McLuhan, McLuhan 1988].

An art lover might be alarmed at the proposition of regarding a work of art as an artefact, but this is not an attempt to deprecate art. On the contrary, art wins from this approach: we can understand its effect better.

Artefacts form the environment in which human corporeality is shaped. The idea of 'the body' may take part in various discourses. It may, for example, be a metaphor for 'human incompleteness', when we are told that 'this is only the body, there are the soul and the spirit besides.' It may be a metaphor for 'human ontological integrity', when we are told that the multifaceted nature of corporeality leads people to speak of 'the body of the spirit, the body of the soul, and, finally, the body of the body.' But in any case it will be right to regard the body as the means by which nature becomes a human being.

What role did technology play in the coming into existence of the human being and of culture?

Researchers consider that at the root of the turn towards materiality we find the works of the anthropologist André Leroi-Gourhan [Ingold 1999: 411–53; Krutkin 2015: 187–99]. As a palaeontologist, Leroi-Gourhan relied on the results of the most diverse disciplines, from archaeology and biology to sociology and art history [Leroi-

Gourhan 1993]. His palaeontological perspective led him to imagine technology as the collective name for everything that works by mediation, when the principle of circular motion is used. He believed that the underlying principles of technology were present at the beginning of life and evolved gradually over time; technology is a factor in the biological dimension of humanity. Technology is older not only than labour, but even older than humanity. The exciting picture of the evolution of life drawn by the scholar — from fish to computers — cannot fail to impress the reader by its scale.

The ancestors of man evolved in parallel with other mammals until they began to walk upright, at which point there was a sudden change. It was not cranial capacity but the vertical position and the evolution of movement that played the decisive part in anthropogenesis. It would be a mistake to think that the specifics of humanity are that humans use tools and animals do not. In Leroi-Gourhan's opinion, the specifics of the human relation to the world are that people can separate tools from their bodies, whereas animals' tools (and they are perfect in their way) are merged with their bodies [Leroi-Gourhan 1993: 237].

The liberation of the hands from their locomotive function caused the emergence of two important connections. The first is the pair 'hand and tool'. The liberation of the mouth from the function of seizing and holding prey caused the realisation of another pair, 'face and language'. The motor functions of the hands and face are decisive factors in the emergence of gesture, which is on the one hand connected with material action, and on the other with language and the aural symbol [Leroi-Gourhan 1993: 187]. The hand is not a hand per se, it is what it does when using tools, and the capacity for language too only exists in the process of speech.

The making of stone tools, he considers, is a bridge between the animal world and the human world, in which tools may be separated from the body. Gesture begins as a chain of operations with tools, and this chain is at the same time an expression of knowledge and ability, and here the human being's movements and perceptions are linked.

Gestures of this sort go beyond the task of adapting to a situation, they are capable of creating their own situation. a tool which is 'liberated' from the body does not by any means become an external prosthesis, it is connected with the body as before, but it is an 'outpouring' or 'secretion' of the anthropoid body and brain [Leroi-Gourhan 1993: 91]. Using the idea of gesture, Leroi-Gourhan demonstrates that tools and bodies are deeply interpenetrative. Tools and bodies invent each other, and this is what lies at the root of the triumph over the dualism of the substantial and the insubstantial, the material and the immaterial.

Gesture is not a kind of language, but a part of every language. Our speech relies on articulatory gestures. We have no grounds for opposing the 'language of words' to the 'language of gestures'. Gestures are accompanied by a one-sided semiotic conceptualisation; a gesture is not a sign, it is '*le travail qui précède la constitution du signe (du sens) dans la communication*' [italics in the original. — V.K.] [Kristeva 1968: 50].

According to Leroi-Gourhan, the meaning of a gesture consists in the work that it does, without reference to the meanings that the parties to the communication have available to them, with no need for a symbolic code or of a recipient to 'read' the gesture as a sign. What is important from the palaeontological point of view is not the opposition between gesture and speech, but the discovery of their origin from a common root.

His thoughts on technology depended on a huge archive of descriptions of technical processes — forging, trimming, casting, shaping — which at first were achieved by manpower, then by the power of animals, air, wind, water and fire.

The invention of the wheeled cart, the plough, the windmill and the sailing ship should be seen not only as the impulse of the human spirit, but also as a biological evolutionary phenomenon [Leroi-Gourhan 1993: 246], as mutations of the external sociocultural material organism, which is a continuation of the physiological human body.

Technical contrivances, in Leroi-Gourhan's opinion, are at the same time tools and gestures, organised in a particular order, and this syntax provides series of actions with both stability and flexibility [Leroi-Gourhan 1993: 231–3].

The forces of nature and the artefacts of culture that act on humanity — where will they lead? Leroi-Gurhan's answer — to placing humanity on an evolutionary scale between its wild ancestor and a spiritualised angel — is a romantic dream. Humanity's double may be not an angel, but a perfect machine, an automatised robot. He wrote that '[t]he nightmare picture of robots pursuing human beings in a forest of mechanical tubes will come true only to the extent that other human beings will have regulated the robots' automatic system' [Leroi-Gourhan 1993: 249].

Production and language, i.e. tools and signals, albeit in an embryonic form, are nevertheless present among our elder brethren. But what is not present in the world of animals? They have no writing or reading of symbols [Leroi-Gourhan 1993: 188]. He has in mind that writing that left traces 30,000 years ago on the walls of caves; he has many works devoted to them.

Is it true that these cave-paintings were a hunting manual, an encyclopaedia of the animal world, exercises of ancient artists? Leroi-

Gourhan is inclined to think that these paintings were the graphic representations of myths. They do not in the least resemble artistic copies of reality. They were the work of people who used these images to study the art of sight and the art of speech, and learnt to connect the image and the word.

Marie-José Mondzain, a key author in contemporary visual research, thinks that it is wrong to consider images as derived from vision. ‘We do not see the world because we have eyes’ [Mondzain 2010: 308]. Leroi-Gourhan writes about this too: ‘Two languages, both springing from the same source, came into existence at the two poles of the operating field — the language of hearing, which is linked with the development of the sound-coordinating areas, and the language of sight, which in turn is connected with the development of the gesture-coordinating areas, the gestures being translated into graphic symbols’ [Leroi-Gourhan 1993: 195]. Mondzain also makes an important methodological observation for our question: ‘Leroi-Gourhan (1964–5) is no doubt the one who has come closest to what philosophy might be able to gain from this testimony when the expert renounces analogical fictions’ [Mondzain 2010: 312].

2. Image as artefact. From mythography to digital representation

In Lev Manovich’s words, we need to learn to read the word ‘photography’ anew. “‘Photographic’ today is really photo-GRAPHIC, the photo providing only an initial layer for the overall graphical mix’ [Manovich 2006].

A photographic image is an artefact, although it may seem that figures appear by themselves on the sensitive emulsion. But the image does not appear because we have forgotten to cover the lens. And to set about ‘light writing’ it is not enough just to give the camera to the cameraman, we need him / her to have a particular vision. This is the idea of the psychologist James Gibson: besides direct perception, people have ‘visual perception’, when people cross from the visible world to the perceptual field [Gibson 1979].

The philosopher Ortega y Gasset also has a picturesque description of this transition. Let us imagine that we are looking at a garden through a window-pane. Our eyes have to get used to it. What we want to see is the garden, that is what we focus our attention on, and our gaze passes through the glass without stopping. Seeing the garden and seeing the glass in the window are two incompatible processes: the one excludes the other, and each requires a different adjustment of our gaze. In everyday life priority and importance will be accorded to reality, such as it is outside the window. To cross over to visual perception (to the photographic representation, but

not only that) we have to bear in mind the glass through which we are looking [Ortega y Gasset 1928: 17].

Onto this screen (which may be imaginary) is projected the representation of what we see. There is an easy way of crossing over to visual perception, and that is the simple gesture of making a square with the fingers on the plane of the imagined frame. This is every camera operator's gesture.

The image is an artefact like other artefacts, it is an objectification, the product of the mediation of the non-mediated, a materialisation of the immaterial. These characteristics are applicable to any image.

Like other artefacts, images are a means of organising the world. It is also true that they organise humanity from the direction of perception. This is done by the artefacts themselves, they enter experience as endowed with a particular *affordance* (Gibson's neologism). Artefacts (things, images, symbols) in connection one with another form the cultural landscape. The materiality of the landscape lies in its action, its capacity for participating in the formation of people's identity.

The materiality of the image is connected with substantial parameters: thick cardboard, and the frame in which the photograph is mounted. However, the materiality of the photograph is not just a matter of the substance of the cardboard, but in the work of the medium. Photography works, because the materialisation of the immaterial is realised in it when it allows something to be seen through itself. In Elizabeth Edwards's words, 'photography as an artefact is not only the scene for human action and interpretation, it is an inalienable environment for the interpretation itself [Edwards 2002: 67]. Without this sort of transparency it does not cross the horizon of the material, and remains immanent. Sometimes this transparency is characterised as 'virtuality'. The concepts of the real and the virtual have their own history, but is it right completely to deprive the virtual of the status of the real? The opinion of W. J. Mitchell, an author who stands at the beginning of the visual turn, is typical. He remarks that "The metaphor of "virtuality" seemed a powerful one as we first struggled to understand the implications of digital information, but it has long outlived its usefulness. <...> It makes more sense to recognize that invisible, intangible, electromagnetically encoded information establishes new types of relationships among *physical* events occurring in *physical* places' [italics in the original. — V.K.] [Mitchell 2004: 4].

The first images, in the opinion of Vilém Flusser, functioned as signposts in the world of myth. The mythographic system of signposts was the platform for palaeolithic art. It served as a map for a very long time, but with time the images lose the power to give directions, and conceal the world to such an extent that man begins to live as a function of the images that (s)he has created. Flusser noted that

then a crisis would supervene: graphic images had ceased to fulfil the function of the signposts that they were at the time of the first myths. However, the ancient images contained within themselves the way out of the *impasse*. Alphabets were composed from their graphic components, as if from pixel elements. The invention of written language was a means of breaking through the barrier and discovering a new way of orientation. Phonemic speech was recorded in suitable linear graphemes, and alphabetic writing came into being. Five thousand years ago, in conditions of settled habitation and the development of metalworking, the tasks of writing down the sacrifices made to the gods, peoples' debts and military victories acquired relevance. Texts were invented in order to demystify images and purge them of magic. But is not history going round in circles? Flusser thinks that when there is an excessive number of texts, they stop providing directions. The function of the technogenic image is to free humanity from the necessity of linear thought, replacing historical consciousness with a second-degree magical consciousness and conceptual capacity with second-degree imagination. The invention of photography, from Flusser's point of view, is as historically significant event as the invention of writing [Flusser 1983].

The representation of the world appears within the bounds of the photographic frame. Framing declares the world to be visible, where the limits of the visible direct the beholder also to the invisible. This is what Hubert Damisch notes: 'One forgets, in the process, that the image the first photographers were hoping to seize, and the very *latent image* which they were able to reveal and develop, were in no sense naturally given' [italics in the original. — V.K.] [Damisch 1978: 71]. Approaching photography as an artefact allows us to bring together the graphic and the photographic, and removes the brusque opposition between analogue and digital representation. The transition from the visible to the invisible is not the capacity of all photography, but that of 'good' photography. From this point of view a good photograph is one which is imbued with a particular *transparency*, which shows the invisible, which allows something to be seen through itself.

Photography nowadays is ceasing to be regarded as an historical document illustrating an existing historical event. In Favero's words, instead of being looked at as an object, a photograph should be used as an object to be looked through. Photography is a type of passage, a channel of connection between objects, history and people. Photography is the inspirer of the history that may come to pass, and not a visual representation of the history that has already been [Favero 2017].

We do not find in photography simply the reflection of objects: here a particular version of the world is composed of light and shade

by technological means, and a visual component of the cultural landscape is formed. It is hard to ignore this in research on society today. As the English anthropologist Daniel Miller bears witness, every day there are about 350 million photographs posted on Facebook, about fifty-five million on Instagram, about 400 million on WhatsApp, and about 450 million on Snapchat [Miller 2015].

Photography is fragile and vulnerable in that it cannot do anything about the frivolous haste of those photographers who do not aim for transparency in their photographs and care nothing for the transition from the visible to the invisible. Neither can it do anything about the viewer's choice of the screen of the visible field on which, in one way or another, the viewers project the image.

3. *The photographic camera.* ***The theatre of photographic gestures***

Damisch notes that one must not imagine the black box of the camera to be 'neutrality' or its settings unprejudiced [Damisch 1978: 71]. As a tool, this box is connected with human gestures. Many researchers have written about this.

The camera, as the instrument of photography, contains within itself the means to codify and develop the photographic gesture. The event of the gesture evolves within the camera, and this is facilitated by a complex mechanism of bolted joints, cogs, transmissions, guides for the movement of the lens, shutter mechanisms, mirrors and prisms. This is noted in Parshchikov's observations: 'The modern camera is a smoothly organised miniaturised theatre, democratic in the ancient sense, and relatively accessible;' 'the visual potential of the stage equipment of the theatre almost coincides with the working possibilities of the lens. Brightness and darkness are regulated, mixed and quantified by a turn of the aperture stop.' Regulating the mixture of light and darkness produces the mediation of the unmediated, and framing produces the materialisation of the immaterial. It was noticed long ago that a big enlargement reveals the optical unconscious. Parshchikov writes that 'the camera chooses the living space for its intended hero by means of the magic ring of the depth of field, which links the functional quantity of the necessary light with the occupation of space. This is the collaboration of field and focusing, their existential parameter' [Parshchikov s.d.]. We use light as a dramatic force symbolising the distribution of good and evil in the world.

As (s)he looks through the view-finder, the photographer waits for the moment when the picture will look like what (s)he thinks about it. (S)he is present in the frame, because the camera fixes his / her decision to press the button [Berger 2013]. The photograph and his / her viewer think in images.

Good photography is directing the camera and knowing how to obey its codes, not only acquiring the necessary gestures, but also extending one's bodily experience. People make sense of the world not only with logic and language, but also with body and feelings. As John Berger remarks, 'looking brings closer', and there is a connection between 'displacement and vision'; he states ironically that there is 'a certain parallel between the act of piloting a bike and the act of drawing' [Berger 2011]. The same thing can be heard in Flusser's words: the photo-gesture is an act of pursuit in which the photographer and his / her camera are fused into an indivisible function [Flusser 1983].

Technology and corporeality, in Leroi-Gourhan's opinion, can only be understood as a unity. Technology is both tools and gestures, organised in a particular sequence, and this syntax bestows upon series of actions both stability and flexibility [Leroi-Gourhan 1993: 231–3]. A gesture begins as a realisable intention, as a chain of operations performed on the world with tools, and this chain is at the same time an expression of knowledge and ability, where human movement and perception are linked.

A person is involved in the process of the genesis of photographic materiality in his / her entire corporeality, as François Laruelle writes: 'Before the eye, the hand, the torso are implicated in it, perhaps it is from the most obscure and the most irreflexive depth of the body that the photographic art departs' [Laruelle 2011: 11]. Laruelle's question, 'How exactly does the photographer, through his body, his eye, his camera, relate himself to the World?' [Ibid.: 8] could be extended: how can a person looking at a photograph or screen correlate himself / herself with the world? (S)he does not do so simply through the information received, but through the participation in the image that (s)he experiences — when (s)he is not acting, but acted upon. Laruelle's ideas about non-photography are no more an attempt to do away with what we know about photography than non-Euclidian geometry renders Euclid's figures unnecessary. What is new is neither a new way of producing photographs nor new ways of 'thinking about photography'. It is a question of a new 'thinking with photography'.

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1

I shall begin by saying that I do not think it productive to separate the subject, methods and theoretical approaches of anthropology and other disciplines. Good articles in the social sciences solve specific theoretical problems and / or change the social agenda or the language in which some phenomenon is spoken of. To this end the author may use those resources and rely on those authors that are relevant to his / her aims, and even go beyond the boundaries of the academic genre. As an example one might take the way in which Donna Haraway describes the figure of a cyborg as 'a creature of social reality as well as a creature of fiction' [Haraway 1991: 149]. She uses for her own ends the ideas of feminists and critical theorists, science and technology scholars, anthropologists, philosophers and even the authors of feminist science fiction, which allow her to reveal the figure of the cyborg from different angles. (She borrows the critique of writing and literacy as the basis for distinguishing between 'civilised' and 'savage' peoples from the anthropologists James Clifford and George Marcus.) It is thus quite logical for every researcher to assemble his / her toolkit to fit the problem that (s)he is trying to solve.

When speaking of the anthropological view of the body and technology, one should perhaps recall the attention paid by anthropologists to the cosmologies of 'non-Western' communities, which drew the boundaries between beings, including human and non-human beings, in the most diverse ways. If we want to rethink our ideas about the body and technologies, we can turn to examples of the categorisations of the world of, say, Australian Aborigines, for whom a man, his / her group and his / her totem are merged into a single whole [Durkheim, Mauss 1903]. Using the multiple means of classifying the world described by anthropologists, we can offer conceptualisations of the body and technologies which are new in principle, such as those in which they are not opposed to each

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other, but presented as something combined, inseparable, as part of a complex interlinked system of ‘man + environment’.

2

The interest in the body *sui generis*, and not in its representations or the discourse about it, etc., that the social sciences have mapped out, seems on the whole important and interesting. Social constructivism, for all its merits, did not allow us to speak about the biology of the body (including distinctions in biologies of bodies), consigning that domain to researchers in the natural sciences and medicine. ‘In various forms and variants the social sciences delineated their own objects *alongside* those of biology. One of the arguments for doing so was that this helped to ward off racism’ [*italics in the original.* — A.K.] [Mol 2002: 18]. Annemarie Mol briefly, but pithily expresses the policy of the social sciences ever since the Second World War: so as to avoid racist and eugenicist discourses, the researchers in the social sciences distanced themselves from conversations about the material, physiological body, regarding it rather as the sand, the blank, passive, neutral sheet of paper on which social phenomena leave their traces. Attempts to create a special region of ‘the social’, with which it was allowable to work, as opposed to ‘the biological’, which was the domain of biologists and medics, led to the creation of a whole series of dualisms: sex vs. gender, disease (pathology) vs. illness (the experience of being ill), impairment (physical damage) vs. disability (invalidity).

In medical anthropology this favoured the situation whereby one of the key directions of work became the study of the subjective meanings that people give to their conditions (the analysis of narratives on illness; see, for example: [Mattingly, Garro 2001]). Attention to meaning became part of that intellectual movement which is called the interpretative, or symbolic approach. This approach, which began in the works of Clifford Geertz, George Marcus and James Clifford, directs the researcher’s attention towards the conceptual world of the people being studied, the language of their pain, fears and experiences. Following the call of Clifford Geertz, anthropologists set about ‘reading the texts’ of culture and their hermeneutic interpretation. Medical anthropologists confined themselves to a certain kind of text, principally the subjective experiences of patients. Disturbed by the facelessness of medicine, the predominance of the *language* of pathology, i.e. functional harm to the body, medical anthropologists set themselves an entirely applied task: to convince doctors that they should take account of the patients’ perspective, with their interpretations of their own bodies and explicatory models of illness. The doctor’s task is correct translation from the *language* of illness to the *language* of disease, and that of the anthropologist is to play the role of cultural broker, of translator, conveying to the doctor the experience and ideas of the patient about what is happening to him / her, the social context

of his / her life. Drawing a line between the biological and the social / cultural dimensions of the body and concentrating on the second dimension provided a solution to a series of problems: showing the variability and constructibility of ideas about bodily infirmities, the importance of social, family, subjective meanings of illness (and also for a more effective treatment and a greater readiness on the part of the patient to listen to the doctor and follow his / her instructions). However, the human body remained without reflection. *Impairment, disease and sex* became the social scientists' 'blind spot'. Knowledge about the physical body was left entirely to the doctors and natural scientists.

Works by Annemarie Mol and her colleagues (the author will be grateful for information about other texts that are significant in this sense) frankly upset the status quo, invading spaces and contexts that had been labelled as 'Western medicine'. They began to analyse how *diseases* are 'made' in clinical circumstances: how medical diagnoses are made, how treatment is carried out, 'the way people's bodies and lives are shaped by the activities of doctors, nurses, technicians, and technologies, and the work involved in making textbooks come true' [Mol, Berg 1998: 3]. Shifting attention from meanings and ideas to practices, they began to show that *diseases* are not singular, any more than the practices of doctors from different specialisms, different hospitals, different countries, etc., are singular.

Likewise of interest is the conceptualisation of the body proposed by Mol as a semi-permeable system constantly interrelating with the outside world: '[T]he metabolic body of a person with diabetes absorbs food and fluids from the outside, and expels waste. It does not keep all that is foreign to it outside itself, but exchanges matter with the rest of the world. a moment ago, the apple was still in the fruit bowl. Now you have bitten into it, chewed and swallowed it, and started to partially digest it. a moment ago, the water was still in your glass, now it is being absorbed in your intestines and thinning your blood, which will thicken again in your kidneys. The boundaries are not open. The intestinal lining allows carbohydrates to pass, but it stops bacteria. Lung parenchyma allows oxygen to enter, but keeps soot particles out. Urea exits via the kidneys, but protein is not meant to do so. Neither closed off, nor open, the boundaries of a metabolic body are semi-permeable' [Mol 2008: 32]. It seems important to me here that the author displays the body not as an autonomous entity, but as surrounded by the world and constantly in contact with it. In this sense a diabetic's body, like anyone else's, cannot be conceptualised in isolation from all those foodstuffs which (s)he swallows every day, physical activities, stressful events, or the technologies which enable the various physiological indicators to be observed (such as the sugar level on the screen of a glucose meter).

3

It would be nice if, by analogy with such important ideas of the early anthropologists as the critique of cultural absolutism and ethnocentrism, the anthropology of today and the future were to work more towards a re-evaluation of the foundations of anthropocentrism. The development of biotechnology in the second half of the twentieth century and the beginning of the twenty-first has provided a large number of empirical cases for blurring the boundaries between human beings and technology, and between human beings and other animals. For example, in the 1970s, when artificial breathing apparatus was invented, there began to be people whose brain had ceased to function, but whose heart continued to beat thanks to the machine. In parallel with the blurring of the boundaries between human beings and technologies, animal rights activists began to speak of the relativity of the categories of 'man' and 'animal'. In 1975 the Australian moral philosopher and utilitarian Peter Singer asked in his book *Animal Liberation* what there is in the concept of 'man' that gives every living representative of the species *Homo sapiens* inalienable rights but excludes non-human animals, notwithstanding the cognitive abilities of particular representatives of different species. He proposed the use of the term *speciesism* (by analogy with sexism and racism) to characterise 'a prejudice or attitude of bias in favor of the interests of members of one's own species and against those of members of other species' [Singer 2002: 6], and defends the idea that non-human animals deserve the same consideration for their interests and needs as humans. An ever-growing awareness of the interdependency of the various life-forms on Earth, as well as the production of new chimaeras in the laboratories of the world, may push anthropologists towards new conceptualisations of the world in which the myth of modern autonomous man is replaced by other myths that reject the pure categories of 'human', 'technology', 'animal' and are populated by 'cyborgs', 'borderline entities', 'monsters' — 'signs of possible worlds <...> for which we are responsible' [Haraway 1991: 2].

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3

My train of thought about the questions asked by the editors of *Forum for Anthropology and Culture*, was like the process of factorisation in mathematics: reducing the body as an object of scholarly research to a series of multi-dimensional projections on the basis of its properties / factors. Accordingly, the 'Forum's' questions have taken on the following form in my text: what could be the research projections of the body in the technological dimensions of the future and how can they become the subject of anthropology?

Obviously, we must distinguish between *the body* as the material location of an individual and *bodies* as the paradigmatic objects of technologies (biopolitical, repressive, modernist, etc.). In my opinion, a significant amount of anthropological research into the body technologies of the future has inherited, albeit in an inverted form, the semantic fog of the twentieth century — the episteme of the body-signifier, the body-metaphor, the imaginary abstract bodily structure (the 'body map', the 'body diagram'). This imaginary body brings me to the first problematic point: the question of the anthropological researcher's wishes. The declared *orientation towards the body* looks, in this case, somewhat speculative: the body as a *thing* escapes the researcher's gaze (or rather the researcher does not want to allow his / her gaze to rest upon the body), and is replaced by a machine, a signifier, a topology, a force — one or another set of representations that may be important for ethnography, but are not always

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valid for technology. As a result *the body* (and *bodies*) have been scattered at random beneath the lens of anthropology which is brought to bear on it: and their innumerable reproductions (iconography, body diagrams), the boundaries and divisions of the body, endlessly differentiated 'other' bodies (diseased, female, homosexual, juvenile, dead) have become visible and significant.

The synthesis of technology and the semiotic body is now represented by the concepts of the technological mediation of the body, and their influence will probably only increase [Belting 2005; Dant 2010; Zeman 2012], etc. The future technological projection of the semiotic body will be research into the techniques of digitising the body and the phenomenology of the digital body: the processes and principles of its encoding, the creation of digital copies or reproductions and their distribution over web information channels. The empirical plan of this projection proposes the existence of the body in two registers of informational being: firstly, the seeing and functional body-subject (centred around the apparatus of perception, natural or technologically supplied, functionally technomorphic — with the help of an exoskeleton, transplanted organs or, at the very least, glasses); secondly, the body-communication presented to some other, a bodily image conveyed by artificial channels. Accordingly, the programme of anthropological research in the first case should be questions about the integration of the body, its technological enhancements and supplements, extensions and intrusions [Sokolovskiy 2017: 25, 33], the humanity of perception and recognition devices, the limits and ethics of enhancing bodily functions (and even, probably, sickness as morphism¹): the orientation of the registration of celestial bodies on the spectrum of visible light (i.e. visible to humans), exoskeletons and biological prostheses, devices to aid seeing (lenses, synthetic crystals) and so forth. In the second case research will be focused on problems of encoding and the translation of the body (the stigmatisation of bodies and conditions, bodily nomenclature, linguistic, visual and cybernetic codes, the syntax and dispersion of bodies — virtual distribution on the net).

The toponymic body-code: a series of project sketches made by the citizens of Novokuznetsk in 2015 showed how easy it is to work in body-metaphors. The informants placed geographical objects — significant cities and regions — on the silhouette of a body, creating a multidimensional map of the relations of power and ideology, the regional division of labour, spatial dispositions and scaling.

Let us not forget that Latour's inversion of actancy is an element of the technological meta-narrative, which returns us to the

¹ An apologia for certain genetic defects and their carriers as a new type of people, BIID syndrome, deliberate infection of children with chickenpox, etc.

4

question of the anthropological logic that reconstructs that meta-narrative.

I pin my hopes of a new projection — of the body-as-thing, of flesh, of organic substance — in the field of anthropology on the ‘material turn’, and suppose that it will be conditioned by a very minor shift in the anthropological paradigm. Two other groups of factors will have a much greater effect on the realisation of the body-as-thing, in the first place, progress in biotechnologies affiliated to the substance of the body: tissue-engineering, organ transplants, genetic modification, cloning, the technologies for the destruction and transformation of the dead body (dissolving in potassium hydroxide, freezing with liquid nitrogen before crushing the mineralised remains, making posthumous souvenirs out of compacted remains, etc.).

The other group of factors that convincingly confirm the body-as-thing in its status as an object of anthropology is composed of the effects observed over recent years of public reactions to those technologies: news about techniques for transforming flesh (not necessarily human flesh) is regularly disseminated in the media and produces an active public response.

I notice that the organic status of the body is becoming the locus of the biopolitical guerrilla war of today, the resistance to expert discourse in the form of HIV-dissidence (the ‘invisible’ virus is declared to be non-existent), refusal to vaccinate (vaccinations ‘admit’ illness into a healthy substance, making it unhealthy), ‘ecological’ burials, which quickly return the body to the form of nourishing humus, economic and ecological institutional limitations on genetically modified food.

How can the ‘biomass’ of a repressive metaphor become the analytical apparatus of anthropology?

The model for a new vision of body technologies remains for me the fictional television series (to be precise, not science fiction, but rather science phantasmagoria) *Lexx*,¹ which contains a radical view of the politics and technology of the corporeality of the future. It is a future in which engineering technologies are biological: apparatus consists of flesh and organs, living machines feed and die. In this ‘inside-out’ world, the human body, by contrast, may be ‘decarbonised’, have its vulnerable and corruptible organic nature removed, along with the subjectivity that is, metaphysically, linked with it. The subject with its desires and motivations is concentrated in the organic components of the body, and what remains after their removal is only the actant, the bodily machine. Ecology merges with biopolitics: the processing

¹ *Lexx*, 1997–2002, dir. Ch. Bould, P. Donovan et al., Canada, Germany, Britain, USA.

of the bodies of criminals in bioreactors into fuel releases the morally and juridically 'pure' substance of their flesh for further circulation. Overall, the relationship between corporeality and technology in this version of the future perverts the technological paradigm of the modern world, which opposes inanimate 'iron' devices to the flesh of the 'living' human being, creating a symbolic plan which is perpendicular to it, in which, essentially, new anthropological projections of the body are possible — not only the technological extension of the body, but the corporeal realisation of technology [Dant 2010] in the spirit of Leroi-Gourhan.¹

The bus body: a series of experiments with young people in Novokuznetsk in 2016–17 showed the existence of an interiorised image of the 'bus body', a standard idea of the corporeality of the passenger (self and other) travelling in public transport: those parts of the body which may legitimately come into contact with a stranger, the degree of spatial closeness and contact with the bodies of other passengers and parts of the bus.

This plan focuses the following areas of problems: firstly, the formulation of new foundations for the social subject (unless it is further displaced by technologically and humanly neutral 'actancy'). Reformulating the comic cliché 'Where shall we make the subject?', should it be a source of reflexive consciousness, or is diversity and indeterminacy in its actions enough for us to speak of its 'free will'? What will be the demarcation between the 'real', 'natural' human subject and its organic or inorganic (digital, mechanical) analogue?

Another area of problems is connected with the conceptualisation of the social in a biotechnological world. What groups and communities will be formed by the new corporeal objects? How will the technologies of the organic change the corporeal mediation of power? What semantic structures will form the basis of a new sociality? How will a technologically modified body become equivalent for exchange: will its technomorphism constitute an excess or a deficiency or 'realness'?

In my opinion, biotechnologies are, paradoxically, archaising the perception of the organic body by explicating basic mythological structures. Thus the fear of *infection*, of a force invisible to the eye which changes or destroys the body from within (often by means of eating or breathing), could once be observed in the mythology of exposure to radiation [Mirnyy 2009], in the fear of technological substances poisoning our usual food ('nitrates' in notions about fruit and vegetables in the 1980s, 'hormones' and 'antibiotics' and modified genetic structures in the meat and vegetables of the present day).

¹ See Graham — the biomodel of a car driver's body that enables survival in crashes, made by Patricia Piccinini.

The basis of infection is the permeability of the body-as-thing by *other* substances and the impossibility of controlling their interference with the body: radiation, nitrates and GMOs cannot be ‘seen’ without using technical equipment for discovering and recognising them; there is no control over their borders; they are dispersed throughout the environment, passing through all defensive barriers, including the walls of the house, clothing, and the limits of the body, like a magic influence besieging the ‘fortress’ of the body [Voynilov, Polyakova 2016: 198].

Current discourses on substance effectively combine the fear of infection with revulsion at ‘unclean’ organic flesh for which the source or technology of production has not been socially validated. Monitoring carried out by the Institute for Statistical Studies and Economics of Knowledge, a research institute of the Higher School of Economics, on the social demand amongst Russian citizens for new technologies has produced instructive results. On the list of technologies (including biological technologies), the one that creates the greatest apprehension and receives the least approval from the people surveyed is ‘growing meat from cell cultures’: in 2010 this technology was approved by 47%, and not approved under any circumstances by 37%. In 2010 growing meat produced ‘concern, apprehension’ among 26%, and in 2015 among 35% [Sobolevskaya 2016; Voynilov, Polyakova 2016]. Artificially cultivated meat produced more concern and apprehension than biscuits made from crickets, which were disgusting, but ‘comprehensible’, and was less acceptable to the respondents than genetic intervention in the human body.

The Real and meat: let us remember that in 2013 the University of Maastricht announced that it had successfully ‘cultivated’ meat from bovine stem cells. Eating the meat was an important ritual performance, camouflaging its real ‘repulsiveness’. The meat, which was originally colourless, and was presented to the public as a homogeneous mass in a laboratory vessel, was coloured to imitate ‘normal’ meat and cooked by ‘a well-known chef’ in the form of hamburgers. This attempt to legitimise the meat by imitating the culinary canon can hardly be considered a success; the people who tasted it noticed its gastronomic deficiencies, in that it did not have ‘the taste of meat’ and was far too dry and tough.

This case is noteworthy in several respects. Firstly, it illustrates the problems of the semantic differentiation of corporeality — natural or artificial, organic or inorganic (but what is to be regarded as the opposite — mechanical? synthetic? mineral?). In vitro meat is articulated as ‘artificial’ or ‘synthetic’, although its genetic make-up and biological processes are no different from the ‘natural’ production of flesh, and there is no synthesis in the strict sense of the word.

Secondly, the biotechnological product was noticed to lack 'real' taste, consistency and tenderness: the reproduction of flesh was perceived rather as some dreadful imitation than as a functional analogue.¹ The case of the cultivated meat concludes the fantastic dimension of the corporeal, the axis that separates at one end socially valid decarbonised substance (for example, by cremation) and at the other the reality of cultivated meat that has not undergone symbolisation nor been integrated into the social order. What symbolic status will organs grown in the laboratory and transplanted into human tissue receive in the future? What will be the phenomenological foundations of the new 'natural condition' of flesh?

The problem areas enumerated above are to some extent founded in the futuristic impulse of the technologies of a 'posthuman' or 'transhuman' future. There is, however, one area of body technology that is already part of ordinary life but has not yet, as far as I know, received anything like a full ethnographic description. This is the Russian segment of food supplements and devices for medical self-treatment (stimulators, applicators, massagers): the discourses and actant systems that articulate them form the local semantic field into which the new biotechnologies will be integrated.

I think that it is time that the body was grasped by its flesh, and that this must be done by anthropology as the only one of the social sciences that has a materially orientated methodological apparatus (see the tendency of materiology: [Oushakine 2013] and the turn towards biology: [Bogomyagkova 2018: 36]). The idea of a discrete, simple unit of the 'natural' organic body which is subject to technological 'extensions' and 'modifications' evidently needs re-assessment: the boundaries of that body and its substantial conditions may turn out not to be where we are accustomed to speak of them. I see the key methodological problem as access to field material about the body: as a bulwark of the Real, bodily experience may be encoded at several levels of symbolic systems or be entirely incapable of verbalisation.

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¹ Examples of functional analogues would be, for example, margarine instead of butter or a mechanical prosthesis instead of a limb.

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1

Modern anthropology is an area of knowledge which is relevant to the problems of corporeality and technology. Most of all this concerns such components of it as medical anthropology, but it is also appropriate for other sections of socio-cultural anthropology, including the anthropology of music, the anthropology of diet, military anthropology (the anthropology of the armed forces), etc. In a number of aspects there is a crossover between the anthropology of the body and science and technology studies (STS), as well as philosophical anthropology and trans-human research.

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'The anthropological approach' to studying the problems of the body and technologies is the same as the approach to studying the other fields of subjects that sociocultural anthropology deals with: studying the object in its entirety

(as a whole) using participant observation and applying other anthropological (or ethnographic) methods, including the method of participant practice, i.e. trying the problem out on oneself.

In this sense anthropology allows us to give what might be called an anthropological picture of the interaction between the body and technology. What is 'anthropological' here is the attachment to a particular sociocultural system, be it the culture of a specific ethnos or a separate social group. Examples of this would be: the practice of inoculation among the pastoral peoples of East Africa (in the past and in the present), sociocultural contexts for radical body art in Sydney, the survival of patients in intensive care wards in Moscow, the postoperative experience of patients with transplanted kidneys (and other organs), the aestheticisation of the female body in the context of the development of practices of the treatment and prophylaxis of breast cancer in the USA (or other countries).

That is, unlike, for example, the philosophical view of the same object, where 'breadth' of view and 'universality' of explanations predominate, in anthropology, as a rule, the 'specific' and 'local' predominate.

2

I personally have a greater familiarity with and understanding of the approaches approved by medical anthropology. One of them is presented in the celebrated article 'The Mindful Body' by Nancy Scheper-Hughes and Margaret M. Lock (1990), in which the authors formulate a series of questions regarding the medico-anthropological perspectives of research into corporeality. Developing Foucault's ideas, they distinguish three types of corporeality, the individual, the social and the political, presenting the body as a surface for the expression of human experience — individual, social and political. I think that it is precisely within the framework of this experience that the experience of the interaction between the body and technology is present. For Lock, for example, this was the foundation of her own research on corporeal experience in the context of the spread of the technologies enabling artificial life-support and transplants in North America. Such is her book *Twice Dead* and a whole series of publications on the anthropology of biomedicine (1990 — present).

In short, any technology which can be applied to human beings is never presented in its 'pure form', but in a 'cultural package' and clad in social relationships. For example, the biomedical technology of organ transplantation is not simply a set of particular measures and methods (selection of the donor, genotyping, surgical intervention, implantation, anastomosis, immunosuppression, and so on), but also a social action, which, among other things, establishes new social connections between the donor and the

recipient and between the recipient and the relatives of the dead donor. In the context of such an approach it is clearly visible that donor organs have their own 'social life'. The technology of organ transplantation crosses the boundaries between the living and the dead, between bodies, between the natural and the artificial, crosses the boundaries of morality, and sometimes even those of the law (in the case of the illegal trade in donor organs, which is yet another by-product of globalisation and neoliberal economic models).

3

Besides the immediate task of the anthropological study and description of many new cultural phenomena — biomedical technologies, cognitive technologies, digital technologies, nanotechnologies — in their effect on (traditional) human corporeality, it is evident that there may also be the new and unexpected task of studying and describing various types of hybrid corporeality, i.e. bodies and bodily experience characterised by the implantation (under the skin or into the tissues) of new technologies. For the most part these are technologies for preserving life and observation. Perhaps the first to raise this subject among medical anthropologists was Cecil Helman in his book *The Body of Frankenstein's Monster* (1991), which described a series of medical innovations such as prosthesis, organ transplantation and so forth, in relation to British and American cultural experience.

In this sense many different hybrid beings have recently 'slipped' into the field of interest of sociocultural anthropology, their 'hybridity' being conditioned precisely by the combination of the organic and the technical. In my book *Voploshchennyi chelovek: zapadnaya kultura, meditsinskiy kontrol i telo* [Man Incarnate: Western Culture, Medical Supervision and the Body] (2000) I attempted to call these phenomena 'cyborg bodies' and 'symborg bodies'. Much water has flowed under the bridge since then, and the number of publications on the topic has increased incredibly. There is whole genre of research into cyborg technology, which has attracted the attention of many authors in various lands. Nor are some of our transplantologists standing aloof from it, seriously considering the question of how, using certain artificial ways and means, they can ensure the survival of donor organs or create artificial ones. From the point of view of these professionals such approaches are more humane and less costly than relying on the use of organs from dead donors, of whom there are never enough, nor will there ever be, given the growing demand.

Another topic is the various technologies of human 'enhancement', be it the use of drugs to improve the memory (nootropics, for instance), use of hormone preparations to promote muscle growth, or the use of endoprostheses of the bones or soft tissues. This is a very broad field of research, treading a path towards the study

of the 'brave new world' (in the spirit of Aldous Huxley) about which Francis Fukuyama warned in his book *Our Posthuman Future* (2002). For the anthropology of consciousness and medical anthropology the study of shamanism in all its aspects may prove useful, particularly insofar as it is interested in hallucinations, trances and altered states of consciousness. However, much has already been done in this direction, among others by the Russian medical anthropologist Valentina Kharitonova. From the perspective of philosophy and bioethics it is a subject that has long been comprehensively studied by a group of researchers from the Institute of Philosophy of the Russian Academy of Sciences, headed by the late Boris Yudin and Pavel Tishchenko.

In his latest research, the Italian social anthropologist Antonio Maturo has shown that, for example, progress in the sphere of technological 'enhancement' of modern human beings is leading to the emergence of a new type of society, which he calls 'bionic'. Moreover, the reasons for the growing demand for enhancement technologies are not only the promotion of new products and services by the companies that produce them, but also the conscious choice of consumers who are ever more inclined to solve their personal problems by purely technical means, without recourse to the help of their family and friends.

4

The evolution of new technologies is already having an effect on the evolution of anthropology and the other social sciences and humanities. I have already mentioned the growing interest of medical anthropologists in the phenomenon of biomedicine and biomedical technologies. Contemporary STS is developing in the same way. There is much that is new in the sphere of anthropology and art, and anthropological research into sport. The sphere of cultural and media studies is also developing.

This may with time lead to the emergence of other new fields of knowledge, including anthropological ones. By the middle of the twenty-first century it will hardly be a novelty to leaf through a journal entitled *The Anthropology of New Technologies*, or even *Transplantology*, bearing in mind the growing interest in various transhuman projects, the active interpretation of the use of robotic technologies in warfare, and the great expectations laid upon the use of exoskeletons (in medicine and again in military use), and so on.

Personally I would not wish artificially to accelerate this process of entering into the new technological age, but most probably it will happen whether we like it or not. Experts believe that in only a few years' time we shall see the swift establishment of a new technological order with a wide application of personless (pilotless) devices, both in the military sphere and in everyday life. For anthropologists this

will mean at the least a new stage in the development of their discipline. Then we shall all be faced with many questions about whether our present culture can accept the challenge and whether our own bodies will be able to adapt to this technological reality.

IGOR MOROZOV

1

Although the attention of ethnographical studies (now included in the wide spectrum of anthropological subdisciplines) has always been drawn to the problems of corporeality and technology, traditional approaches have in the main stressed the description of practices associated with corporeality (for example, rituals surrounding birth or rites of initiation or passage), or else the role of technology in various systems of husbandry (for example, the use of draught animals, or of the ard or plough).

The new turns in the study of corporeality are connected with the interpretation of the role of the body in social practices, beginning with relations between the sexes and the problem of sexuality and the new wave of body symbolism (from subcultural practices to the problem of image), and ending with the problems of a 'healthy lifestyle' and the 'healthy body' as a whole. The body has acquired a commercial element, which in turn has provided the stimulus for the genesis and evolution of new practices (from body-building to cosmetology) that strengthen and emphasise its value and status. The body has always personified status and power, but in new conditions this role becomes particularly significant, and corporeality becomes an important subject to be studied by the social sciences, marketing, image-making and political studies.

As technology improves our lives, making them more comfortable and diverse (in the sense of providing new opportunities for development), it also systematically destroys many established ethical norms and standards, subjecting us to a trial of our 'humanity'. Is it permissible to sacrifice the life of another

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human being and use his / her body or organs to prolong one's own life? This, of course, is not a new question, and humanity has given different answers to it at different stages of its development (was the life of a slave of much value to his / her master, or of an 'Untermensch' to a Nazi?). And these are questions for philosophy and above all for ethics.

Evidently we are faced with an old problem which requires a new solution in the conditions of the modern world, which again faces us with the questions of what a 'human being' is, and what 'humanity' is. The answer to these seemingly obvious questions is not as simple as it seems at first sight. It is enough to remember that the solution to the dilemma of 'the human vs. the non-human' has always been at the centre of attention of religious doctrines and practices. To what extent is God / the Divine anthropomorphic? The problem of this sort of isomorphism has been solved in different ways by the world's religions, which, as they moved away from zoomorphic or polymorphic hypostases of the divinity, nevertheless strove to affirm its human epiphanies, since the possibility of the non-human essence of the divinity and its inaccessibility to human reason looks frightening. This problem has deep cultural and historical roots, which becomes obvious when one studies anthropomorphic objects in culture (we ran up against this when studying the 'doll phenomenon'), and is the key to many problems of the human psyche, since our perception of the outside world is anthropocentric and inclined to anthropomorphise it, that is, to endue the phenomena and objects surrounding us (including those that are not alive, are inanimate) with human characteristics and features. Here there is a wide field for psychological research.

2

The inclusion of modern technologies and the practices associated with them in the field of anthropological research substantially changes research strategies and tactics, and requires new approaches and methods. In the first place these are of course methods that will allow us to see the place of human beings in the world of things, and the mutual link between the 'living' and 'lifeless', their influence on each other and their implantation in the wide network of socio-cultural communications (Latour). Things, as Baudrillard has already shown, do not only form the sociosphere that surrounds us and which is directly connected with social roles and status, but to a large extent they determine a new, 'mythical' hyperreality in which the only 'real' reality is death. This possibly allows it to be said that research into the problems of dying and death as 'the last bastion' of corporeality, where it is fully denoted as the distinct border between 'alive' and 'dead', 'dead' and 'lifeless', will be useful for the understanding of general problems of 'the corporeal' and its correlation with the 'mechanical' or 'virtual'. We can all feel the pressure of this 'new corporeality' when we are travelling in a vehicle

and using it as an external envelope and accelerator, when we use various gadgets, or when we turn to the personal pages of deceased friends on social networks.

As for research into the re-emerging multicomponent human communities, we see great potential in the approaches that are set out in the framework of multispecies ethnography, which are directed towards studying the role of human beings in the formation and development of different biocoenoses, which are considered as systems involving feedback. Domestic animals, birds, trees, fungi, microbes and viruses are not only the 'environment' which human beings inhabit and, to a certain extent, create, but also those components of that environment which to a great extent determine human behaviour, and make people organise their dietary, domestic and even cultural strategies. One would like to think that *Homo sapiens* will occupy an important social and biological niche in post-human societies too. The biocoenosis that comes into being will also include new components, such as nanorobots that will take on the role of the microbiota and control and regulate vital parameters of the organism, from the circulation of the blood to the elimination of harmful substances and cancer cells.

3

The commercial component has always been present in corporeality: the trade in slaves ('biological machines'), sexual services and body parts for medical and magical purposes was known in antiquity and still exists in modern 'primitive' cultures (for example, the use of the body parts of albinos in East Africa). Anthropologists are also thoroughly familiar with the status attached to war trophies in the form of artefacts made from the bodies of the enemy: scalps, skulls, hands, ears, etc., and also the use of parts of the bodies of outstanding warriors as food in ritual cannibalism.

Modern global marketing strategies have of course brought about radical change in the pragmatic component of such 'exchanges', turning the trade in human organs into a high-tech practice 'based on humanitarian principles', even if they are obtained by illegal methods, for example in war zones. Many modern medical technologies are based on the use of parts of other people's bodies, and this includes not only organs such as the kidneys or the heart, but also blood or sperm 'banks', which are also often set up on a commercial basis. The prospects presented by the possibility (still hard to imagine) of transplanting the brain (or head) into a different body threaten to open up a real Pandora's box, considering how rapidly the population of the 'golden billion'¹ is ageing. One can imagine how prominent in this case are the problems of bioethics, which

¹ A term used in Russian journalism to denote the inhabitants of the richest countries in the world [Trans.].

has to answer the question of where to draw the line between 'useful improvements' or 'interventions' and dangerous experiments directed against humanity as a biological species.

4

Modern technologies, as they presume the wide use of various 'substitutes' for human beings, from industrial robots to artificial intelligence, are creating the conditions for a revolution which may lead to the emergence of 'posthumanity' and will inevitably face us with the problem of a 'new humanity'. There are several key problems connected with this. Firstly, there arises the necessity to redefine the concepts of 'living / lifeless' and the boundaries between them. The definitions and distinctions that exist at present proceed from the differences between organic and inorganic, or protein-based and non-protein-based bodies — although, as we know, in archaic models of the world this boundary was different and 'lifeless' natural objects and elements (stones, trees, earth, water) were endowed with subjectivity and the capacity for active participation and development. In this sense technological progress, paradoxically, tends to send us back into a world in which things and 'lifeless' bodies are endowed with 'humanity' and the capacity of 'living' beings for interaction and development. And although this does not contradict our consciousness's capacity for anthropomorphising things (not to mention animals), the transition to a new 'humanness' may be very painful, since it will demand the working out of a new ethics and a new understanding of the place of the 'living' (including human beings) in the environment. Of course, thanks to the long and purposeful activity of the ecological movement, we are already prepared to accept that mankind is not 'the king of nature'. But to agree that we are by no means 'the crown of creation' and that a human being is no more than 'a talking ape' will be much harder, if indeed it will be possible.

To acknowledge the 'lifeless' as 'living' (according to the classification accepted today) is indeed an extremely complex problem. It is one thing to call one's car Susie, Lucy or Tiger Cub (surveys show that this happens quite often) and part of a computer a motherboard, and quite another to regard a mechanism, even one that is anthropomorphic and endowed with artificial intelligence, as one's equal. Especially if it becomes clear that this mechanism is gradually beginning to excel you in all those spheres of activity of which only a human being was previously capable. In this way, the first thing that can be seen as an immediate prospect is an accelerated development of a 'new ethics' capable of taking account of the emerging prospects for relationships within the 'human — (non-anthropomorphic / anthropomorphic) machine' system. The existing developments in the field of technoethics are clearly inadequate, being for the most part oriented upon the technical environment of the industrial era.

Another problem concerning a wide spectrum of anthropological disciplines is the taxonomy of posthuman beings, since there are already cyborgs among us, that is, people equipped with artificial limbs and other organs, and also mechanical devices or elements that correct defects of speech, sight and hearing. And in the near future we shall encounter man-like robots (androids), replicants (biologically modified copies of people, adapted to life and work in hostile environments such as the ocean depths or outer space) and possibly even chimaeras (organisms created by crossing different species) in our streets and houses. This list should of course also include non-anthropomorphic robots, devices endowed with artificial intelligence and mounted in different sorts of bodywork and environment. What will be the relationship between these kinds of beings? Will they resemble the existing relationships in human communities, determined by social, professional, ethnic or racial affinity? Or will new social structures and hierarchies of inequality emerge? We imagine that these differences can determine whole directions of research both within the frameworks of the existing anthropological disciplines and in new sciences about the 'post-human' order which is coming into being before our eyes. It is understandable that this will require significant effort in reinterpreting and assigning new meanings to many social institutions which have been regarded as unshakeable for centuries (education, labour, the family, leisure, health care, the organisation of domestic and other spaces, the relationship with the environment and much else). Will friendship and love be replaced by various types of 'non-business contact' (since, at least for some of the 'posthumans' listed above, biological means of reproduction will be irrelevant), and if so, what? Will medical treatment come to be the same thing as repairs? What form will social communications take, from theatre and cinema to mass meetings and demonstrations? We are faced with these questions, and many others, today, since the answers will be needed tomorrow. And it is better to have a plan of action ready than to be caught unawares by the approaching 'singularity'.

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Feminist Anthropologies of Reproduction: Studying Bodies, Technologies, and Social Dynamics for Three Decades

Introduction

I am grateful for the opportunity to address the important questions posed by this issue of *Forum for Anthropology and Culture*. At the same time,

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I take issue with the assumption posed by Sergei Sokolovskiy that ‘Until recently, medical anthropology, with its focus on the cultural construction of health management and illness, maintained a largely separate existence from the anthropology of bodily techniques and technologies, and it was only radical changes in contemporary biomedical practices that brought about the shared interest of those working in the different subdisciplines in striving for some kind of synthesis of the different disciplines.’ Feminist anthropologists working on reproduction have long explored the relationships between bodies and technologies, raising critical questions regarding how these relationships get defined by various social authorities, contested, and transformed over time. Moreover, since the late 1980s, feminist anthropologists working on issues related to reproduction forged path-breaking trajectories bringing questions of the body, gender, and technologies into cultural anthropology as a whole; and they did so largely by training our methods and theories on cultural processes in the US and Western Europe, in contrast to what had been the discipline’s characteristic focus on non-western cultures. Feminist anthropologists were among the first to examine the symbolic and political provenance of bodily techniques; the consequences of the introduction of novel technologies for enhancing or correcting the body, and for controlling, transforming, and deploying the body for multiple social and political goals. They have studied symbolic constructions of the gendered, raced, and aging human body, and shown how the individual human body gets cast as a microcosm of the broader social body — often the nation but also other essentialised collectivities [Anagnost 1995; Kahn 2000; Rivkin-Fish 2006; Inhorn, Birenbaum-Carmeli 2008; Gammeltoft 2014]. In the following discussion, I delve into some of the landmark scholarly works in the anthropology of reproduction, and I present some of the most interesting, recent texts that point to new directions researchers are taking. My focus on classic texts in this literature serves to emphasise that the maxim, ‘you need to know where you’ve come from in order to know where you’re going’ is as relevant for scholarly endeavours as it is for everyday life.

***Women’s bodies through the prism of the medical gaze:
Feminist critiques***

Inspired by feminist critiques of a male-dominated obstetrics field, with its often patronising, controlling treatment of women, Emily Martin and Robbie Davis-Floyd, respectively, brought core concepts from cultural anthropology to an analysis of the gendered inequalities reproduced in American medicine. In stark contrast to biomedicine’s claims to present acultural Truths about the human body and reproductive processes, Emily Martin’s 1987 ethnography, *The Woman in the Body: A Cultural Analysis of Reproduction* [Martin 1992]

demonstrated how scientific constructions of women's bodies are imbued with culturally resonant, gendered imagery reflecting assumptions about women as inferior to men, and women's bodies as inferior to men's bodies. In early-mid twentieth century scientific medicine, bodies were imagined through the key trope of the machine, and bodily systems were described through analogies to industrialisation and hierarchical forms of communication. In other words, Martin's research explores the consequences of a scientific worldview that conceptualises the female body through tropes related to technology. For example, scientific descriptions portrayed birth as a production process in which the uterus's efficiency should be managed by the doctor, who was conceptualised as a 'mechanic' or even 'factory supervisor'. Menstruation and menopause were characterised as processes of 'failed production' [Martin 1992: 57, 63]. Ethnographically, Martin examined whether women of different backgrounds accepted these forms of knowledge when thinking about their bodily processes and themselves. She found that educated women, those who had invested in and committed themselves to the authority of scientific paradigms, reproduced these same images of women's bodies. On the contrary, when she asked working class women how they would explain female reproductive processes, she found they used imagery that did not communicate 'failure' or 'breakdown', but addressed the phenomenological aspects of the various bodily experiences and placed them in the meaningful context of a woman's life course. The salience of technological imagery for conceptualising the human body, Martin shows, must be examined in tandem with key forms of social stratification. People's relations to dominant cultural meanings partly reflect their social positionality. *The Woman in the Body* emerged at a moment when feminist scholarship was burgeoning and paying particular attention to interrogating the social and gendered effects of a technologically-focused biomedicine. But it was the first ethnographic inquiry into the diverse ways women relate to biomedicine's symbolism and the social effects that result.

Another important classic is Robbie Davis-Floyd's *Birth as an American Rite of Passage* [Davis-Floyd 1992], which draws on anthropological insights about the function of rituals to communicate key cultural values and inscribe central cultural hierarchies on people's bodies. Davis-Floyd examines mainstream American hospital birth as a ritual event that transforms a pregnant woman into a socially competent mother — one who recognises the authority of biomedicine to direct her and her child's lives. In the biomedical imagination, Davis-Floyd shows, the birth process is construed as a dangerous act of unruly nature. The expert use of technology, biomedical practitioners claim, is needed to control this unpredictability, and place it under scientific management. Davis-Floyd analyses the entire scope

of routinised practices and procedures characterising American hospital birth in the 1980s, from the institution's insistence that women wear hospital gowns and sit in a wheelchair, to the routine use of pubic shaving, enemas, pushing in a prone position, episiotomies, and increasing rates of caesarian sections. Dispelling common assumptions that these procedures had health benefits, she reveals them to be unnecessary and even harmful practices that conveyed a cultural fear of women's bodies. Davis-Floyd contrasts the 'technocratic' approach to birth with a 'holistic' approach cultivated and undertaken by home birth advocates and the feminist midwifery movement, in which 'natural' processes are celebrated, women's interests and collective knowledge about their bodies are prioritised, and the benefits of biotechnological management are questioned on the basis of a concern with women's equality.¹

A key theme in the anthropology of reproduction has examined the social effects occurring when new biotechnologies become adopted in local communities. Some studies have highlighted the perseverance of cultural values and meanings in the face of material change; many have detailed the kinds of contestations that arise to maintain or wrest control over the uses and meanings of these biotechnologies. Whether examining the spread of techniques of the body such as coitus interruptus (CI) in nineteenth century Sicily, or the uptake of sophisticated biotechnologies such as in vitro fertilisation and gestational surrogacy in twenty-first century Moscow, anthropologists have explored the ways the significance attributed to technologies is enmeshed in broader systems of knowledge and structures of inequality, from class to race, gender, and sexuality.

Jane Schneider and Peter Schneider's *Festival of the Poor* [Schneider, Schneider 1996] demonstrates how changing fertility practices in nineteenth century Italy were driven by new notions of 'respectability' linked to bodily techniques. Specifically, as educated Sicilians began using coitus interruptus to prevent pregnancy, cultural discourses circulated that ascribed cultural prestige to practices of limiting of childbearing in the name of 'rationality'. CI was considered a sign of deliberate 'sexual restraint' — considered both a moral good in itself, and a rational practice of preventing one's family's impoverishment by heeding economic constraints. Conversely, Sicilians who continued to have greater numbers of children became besmirched with the cultural stigma of 'irrationality', left farther adrift from emerging notions of respectability.

The Schneiders also devote considerable attention to understanding why poor families were less likely to adopt CI and strive to limit

¹ In the context of Russian anthropology, a similar approach has been adopted by Ekaterina Belousova [Eds.].

their childbearing. If educated classes blamed poor people for their supposed failure to contain their sexual desire, demographers and sociologists also described the poor in culturally biased terms — presuming them fatalistic and less practiced in rationally planning their lives. Other scholars have argued that poor couples who had large families were actually acting according to a personal rationality based on practices of treating children as source of labour and old-age security, rather than as economic drains. In contrast with these approaches, Schneider and Schneider highlight the ways patriarchal family structure and gender relations, along with capitalist boom and bust cycles, shaped working-class Sicilians' reproductive practices. The locus of agency was not entirely situated within the couple, they show, as people of all classes lived in contexts of *reputational networks* that helped define what constituted a good family and largely determined reproductive practices [Schneider, Schneider 1996: 8–9]. Bodily techniques, in other words, are taken up and deployed as part of broader conceptual and moral understandings, embedded in patterns of social authority, and constitute symbolic expressions of identity, power, and social distinction. They are not universally determined by individual agents, nor are bodily techniques always expressions of the pursuit of rationally defined ends. The Schneiders demonstrated how fertility outcomes often represented the expectations of patriarchal family ideology, not individual Sicilians' decisions.

Understanding local cultural ideas about fertility, women's virtue, and aging are central to grasping the logic of contraceptive use, as persuasively argued in Caroline Bledsoe's ethnography, *Contingent Lives: Fertility, Time, and Aging in West Africa* [Bledsoe 2002]. Bledsoe's study of Gambian culture emerged during her collaboration with demographers analysing contraception survey data in the society. She was intrigued by findings showing that a small proportion of respondents who had not yet had their desired number of children began using contraceptives in their early-mid thirties. Whereas the demographers dismissed these findings as errors ('noise'), Bledsoe explored the issue ethnographically, and found that decisions to use contraceptives when more children were still wanted had epistemological roots in Gambian understandings of the body and reproductive processes. Specifically, Gambian views held that women's bodies are finite sources of energy deployed for various purposes over the course of one's life; a virtuous woman is one who uses her bodily energy to bear and raise children and care for her family. If a woman has not been able to conceive, or the children she has borne died, she strives to rest her body for a period of time to gather up her remaining energy and deploy it for the purpose of having and raising children. Rather than view female fertility as waning with age, Gambian cultural views judged a woman by how

she expended her given bodily energy and what she used it for. Contraceptives were embraced as affording women a 'rest' necessary to regenerate strength and give birth and care for more children in the future. Bledsoe's ethnography thus reveals how contraceptive technologies were deployed in the service of specific cultural notions of virtue and bodily function, in contradistinction to scientific ideas about the reproductive lifecycle and process of aging. This research presents a powerful, cautionary tale to experts in international development and global health: local cultural knowledge about bodies, technologies, and ideals of virtue is crucial for unearthing the logics guiding behaviour.

A growing body of ethnographic work by feminist anthropologists of reproduction has been focusing on late twentieth — twenty-first century biotechnologies, including in vitro fertilisation, surrogate motherhood, and prenatal diagnostic technologies, from ultrasound scanning to amniocentesis. These studies continue key lines of inquiry established in earlier work by delving into the historical and cultural meanings associated with technologies and the ways their significations become linked to broader hegemonic systems of power, such as kinship ideologies and nationalism. The analysis of how new technologies become deployed and made meaningful also returns us time and again to the persistent problems of social inequality.

Helena Ragoné's *Surrogate Motherhood: Conception in the Heart* [Ragoné 1994] is one of the very first ethnographies of surrogate motherhood, based on fieldwork undertaken in the US with surrogate mothers, commissioning parents, and the surrogate agencies that brought them together in contractual arrangements. At the time of this study, surrogate mothers were artificially inseminated with the sperm of the commissioning father, as egg extraction and IVF were not yet in common use. Such 'traditional' surrogate mothers were thus genetically related to the fetuses they carried and children they bore, a situation that led to the infamous Baby M case in 1987, in which the surrogate mother refused to relinquish the child to the commissioning parents upon giving birth, and years of contentious legal battles ensued. Ragoné posed several questions of anthropological import in her ethnography: would technological practices of surrogacy change the nature of kinship, and if so, how? How did cultural efforts to legitimise surrogacy involve specific social interventions into the meanings of the process, including the technology and the relationships between parties? Symbolically, the notion of being a surrogate mother — of carrying and bearing a child only to relinquish it to another family — aroused cultural discomforts by acknowledging that women do not always want to mother the children they bear, and may be willing to use their bodies and intimate capacities for financial gain. Moreover,

traditional surrogacy, in which the genetic father's sperm was used to impregnate the genetic mother, carried socially awkward intimations of sexual infidelity and threatened the commissioning mother's status as a 'real' mother-to-be. Ragoné found that surrogate agencies thus promoted a cultural construction of surrogacy that aimed to alleviate the tensions around these various social anxieties. They cast surrogate mothers as altruistic agents providing 'the gift of life' to barren parents; they encouraged commissioning mothers to become friendly with their surrogates, highlighting the woman-woman relationship while diminishing the connections made between gametes of the commissioning father and surrogate.

Additional cultural work aimed to legitimise the compensation surrogate mothers received. Instead of being a 'payment' for temporary use of a woman's body (with its attendant echoes of prostitution), the monetary exchange would be redefined as a 'gift' and institutionalised as a trust for the surrogate's own children's college tuition or the family's needs, rather than made as a cash payment. Yet rather than working to continue the friendship and perhaps creating new kinds of kinship relations between surrogates and the families they provide children for, agencies encouraged commissioning parents to cut ties with their surrogates after the birth and relinquishment of the baby. The heterosexual, nuclear family model was reaffirmed as the dominant and superior model for American society, leaving the working-class surrogates feeling abandoned by the women they had helped to create as mothers. Ragoné emphasised that it was the hegemony of cultural notions of nuclear family, rather than the technology of surrogacy per se, that propelled the meanings and significance of this practice.

Prenatal testing has been a key site for anthropological investigations of the social accommodations to new reproductive technologies. Rayna Rapp's study, *Testing Women, Testing the Fetus: The Social Impact of Amniocentesis in America* [Rapp 2000], explores how new forms of knowledge made possible by technological capabilities raise ethical dilemmas that women navigate as they conceptualise themselves and their responsibilities as potential mothers.

Rapp studied women's experiences with amniocentesis, a diagnostic procedure in which amniotic fluid is suctioned with a needle from a pregnant woman, and used to discover and identify chromosomal abnormalities and neural tube defects in a foetus. It has long been offered to American women who were at least 35 years old while pregnant and is undertaken in the second trimester. Rapp's ethnography examines how women in New York City who were offered the procedure responded, and why; and among those who took the test, Rapp investigated how they responded to a positive diagnosis of foetal abnormality. *Testing Women, Testing the Fetus* demonstrates

the complex cultural, symbolic, economic, and moral concerns that women from different socioeconomic and religious backgrounds bring to these decisions; inasmuch as there is no societal-wide consensus as to how to manage these technological capacities and the knowledge they provide, Rapp dubs the women 'moral pioneers'. For many women in the age of new reproductive technologies, the pregnant body has become a site where making ethical determinations about what constitutes a person worthy of being born, and what justifies termination of an affected foetus, is an unavoidable requirement.

The array of values and concerns that women invoked to guide their decisions about whether to continue or terminate the pregnancy reveal how complex and often painful these experiences can be. For example, white middle class women frequently conveyed tensions between embracing technology as a means of exerting control over one's life and a discomfiting view of themselves as 'selfish' for how this priority underwrote their willingness to abort an affected foetus. Latina migrant women framed an openness to aborting an affected foetus in terms of their commitment to the socioeconomic promises of migration, and well-being of other family members [Rapp 2000: 136–7]. At the same time, Rapp demonstrates that women's socioeconomic and religious backgrounds are not determinative of women's attitudes towards amniocentesis or decisions about parenting a disabled child. Women's responses to this technology also stem from their personal experiences. The availability of amniocentesis for both eugenic and liberating purposes has inaugurated a new frontier of moral deliberations regarding cultural, economic, and personal concerns. Amniocentesis is not, in-and-of-itself, a driver of change, for the process of confronting and using this biotechnology is ultimately to confront broader personal and cultural forms of knowledge and ethics about the meaning of parenthood, personhood, and interpersonal obligation.

If Rapp's case of amniocentesis explores a subset of women with atypical pregnancy trajectories, Janelle Taylor's study *The Public Life of the Fetal Sonogram* examines the social meanings of a technology that has become routinely used during pregnancies in Euro-American contexts and beyond [Taylor 2008]. Sonogram images of the foetus have not only entered the social worlds of pregnant women; they have become central to the political strategies of activists seeking to ban abortion, and even been commodified in advertisements aimed at selling commercial products to families. Taylor asserts that examining the uses of ultrasound images for a variety of agendas has implications for how we theorise technology as a social phenomenon. a common assumption that it is possible to inquire how a given technology 'impacts society' is inadequate, for this phrasing presumes that a 'technology' can be understood

outside of and separate from the ‘social’ context in which it is embedded. In contrast, societies make technologies meaningful, conceptualising them as ‘useful’ or ‘dangerous’ or ‘appropriate’ or in need of regulation, etc., through cultural and political processes that construct the technology *a priori*.

Moreover, Taylor goes further in arguing against the very concept of ‘the body’ as a singular, universal entity that can be analysed apart from social processes [Taylor 2008: 11]. The use and significance of ultrasound images, for example, calls into question how we locate the boundaries of the body, and how such boundaries become malleable in everyday life. It leads us to think about how what used to be considered internal to and inseparable from a woman’s body, a fetus, is now appearing to enter the public sphere separated from the body that gestates it. If interiors can ‘surface’ and become forces promoting economic or political action, then representations of ‘the body’ are unstable. Drawing on Judith Butler and Annemarie Mol, she urges us to think instead of bodies as something that people collectively *do* in diverse ways, rather than as a thing people have [Ibid.: 12]. The social analysis of bodies and technologies is useful as a broader prism through which societal processes come into relief, and, as we saw with Schneider and Schneider, Martin, Davis-Floyd, and Ragoné, these processes often involve the reproduction and naturalisation of systemic inequalities.

Finally, Veronika Siegl’s doctoral dissertation, ‘Fragile Truths: The Ethical Labour of Doing Trans-/National Surrogacy in Russia and Ukraine’ examines the oppressive structures constraining both the infertile female body and the surrogate’s body in Russia and Ukraine [Siegl 2018]. On the one hand, Russia’s cultural stigma of childlessness and infertility, and the controversial character of surrogacy, leads commissioning mothers to hide their surrogacy arrangements from virtually everyone except their husbands. They justify this secrecy as a moral act protecting their child from society’s hostility and discrimination. On the other hand, surrogate mothers endure deep economic displacement, stigma, and a dehumanising treatment as the incubators of a future product. In stark contrast with the US case Ragoné studied, Russian surrogacy agencies symbolically construct the gestational process as a purely ‘business’ matter. Agencies construct the surrogate’s body as ‘risky’, and construct the surrogacy process as a mechanistic ‘work’ experience that demands obedient and docile workers who have no emotional attachment to the ‘product’ they provide. When the surrogate mothers expressed concerns about the future lives of the children they bear, and about the parents who will raise them, the surrogate agency rebuffed their concerns as outside of the surrogates’ scope of privileged knowledge. In this way, Siegl shows how agencies actually created much of the risk at stake through

their distrust, lack of transparency, and rigid approach to the 'business style'. Siegl's study demonstrates how an understanding of these multiple inequalities at stake in infertility and surrogacy — located in specific cultural, institutional, and political-economic conditions — complicates conventional debates about the ethics of surrogacy. Ethnographic insights offer necessary insights into nuance and complexity of on-the-ground dilemmas, mitigating against unreflective acceptance of abstract, universal, or ideological judgments about technologies, bodies, and justice.

Conclusion

Feminist anthropologists of reproduction have done extensive work detailing diverse symbolic constructions of the human body, deployed for varying political goals, historically and at the contemporary moment. The body as machine has been a central metaphor in Euro-American cultural contexts. These scholars are committed to critically examining how various metaphors can work to reproduce or ameliorate social inequalities. Still, the feminist ethnographies examined here do not ideologically reject the idea that some technologies, in some contexts, can be empowering. Bodily techniques and technologies can provide women with new knowledge that augments their sense of control over their lives and requires them to make moral determinations about life itself. In contrast with assumptions that technologies in-and-of-themselves bring on social transformation, these ethnographies show how technologies get taken up in creative and flexible ways, put to use to achieve broader political goals and to realise long-standing notions of the good life, gendered virtue, or practices of distinction. Feminist anthropologists have explored the variety of moral concerns arising from the use of reproductive technologies and the diverse ways women navigate their decisions and justify them. A key insight of ethnographic research on the body and technology is that medical and scientific expectations about the appropriate use of technologies (such as the contraceptive pill) may be undermined by culturally specific notions regarding the body's capacities, women's proper roles, and how to preserve each of them. This line of scholarship brings theory to bear on significant matters of public policy, and opens up the possibility of bringing the field into a much-needed critical dialogue with public health, international development, social work, medicine, and the field of human rights.

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1

Let us begin with what we understand by 'technical' and 'technology'. The Greek word τέχνη means *skill*, or *knowing how* to do something. For this reason τέχνη is an inalienable part of the ἄνθρωπος, *human being*. Human beings are distinguished from the animal world by their greater practical knowledge, their more perfect skills, to which, it seems, there is no end. The role of anthropology

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in studying technology as the extension of human capabilities, or, as the methodologists would say, human enskilment, is hard to exaggerate.

While we are focusing on words, we might remember another term in which ‘human’ and ‘technology’ are combined: *anthropotechnics*. This is how, at the beginning of the twentieth century, a project for improving the ‘human race’ was named, by analogy with *zootechnics* or *animal husbandry* — improving animal breeds. In our country the project was supported by biologists and anthropologists who formed the Russian Eugenics Society in 1920; some of them subsequently became the fathers of Soviet genetics. Eugenics, anthropotechnics and genetics were later criticised as an animalist approach to humanity. By a play of words, one may say that ‘human husbandry’ never did come into existence as a separate discipline, while ‘human sciences’ became more culturally orientated. (One might recall Velimir Khlebnikov’s distinction between *linguistics*, the study of languages, and *linguogenics*, the growing of new ones.) The creation of the ‘new man’ in the Soviet Union followed an ideological path, not a biological one.

2

I would suggest that we should remember the concept of a ‘motor culture’ put forward by Aleksei Gastev, an activist of the workers’ movement and one of the ideologues of Proletkult, at the very beginning of the 1920s [Gastev 1925]. It is interesting in that it unites bodily motion, which was traditionally considered a ‘natural’ thing, with culture, and, therefore, with technology.

As we know, physical motion has been studied for a long time: mathematics and mechanics have formulated the laws of dynamics, and anatomy and physiology have analysed the motor apparatus of human beings and animals. At the end of the nineteenth and beginning of the twentieth centuries, new methods for recording and analysing movements appeared, including photography and cinematography, and new disciplines combining physical and biological sciences were formed such as biomechanics, the physiology of labour and the physiology of motion, and kinesiology. Each studied movement as a physical process from its own angle: biomechanics dealt with the structure and function of the motor apparatus, the physiology of labour with muscle fatigue, the physiology of motion with the co-ordination and regulation of movements by the nervous system, and kinesiology with the application of the laws of motion to therapy and rehabilitation. The body and its movements caught the attention of such diverse disciplines as anthropology and psychoanalysis. At the beginning of the twentieth century there was a great surge in interest in the representation of motion in art: avant-garde painters tried to convey and depict motion in their works, and the new theatre, dance and

cinema explored the possibilities of expression and conveyance of motion. Vladimir Mayakovsky rapped out in verse:

*Our god is the run.
Our heart is the drum.*

Nevertheless the collocation ‘motor culture’ sounded unusual and challenging: at a time when ‘culture’ was conventionally the name only for what was ‘high’ and ‘spiritual’, speaking of ‘the culture of labour’ seemed paradoxical, almost an oxymoron.

Gastev found the sources of culture in economics, husbandry and especially industry. In his view, the new Soviet man must have complete control over his / her body and his / her tools, and be equally well organised at his / her workplace and in his / her everyday life. Gastev defined ‘motor culture’ as the sum of the people’s motivational habits and skills, ‘*the motion of one’s own body*, expressed in such acts as the defence of the organism against attack, the attack itself, pursuit, motor strength, swiftness, what is called motor speed, the cultivation of a precision of movements. The cultivation of their deftness and economy will create a new man with a new motor culture, who will cultivate in himself a vital real portativity’ [*italics in the original. — I.S.*] [Gastev 1924].

So long as we do not think too much about the meaning of ‘portativity’, which recalls one of Andrei Platonov’s neologisms and means carrying out cations efficiently on limited resources, Gastev’s intentions are perfectly clear. He wanted factories, on a country-wide scale, to be turned into ‘vast laboratories’ in which the machine would organise the worker’s activity, cultivate self-control, discipline and intellect. In 1920 Gastev founded the Central Institute of Labour to educate the vast mass of erstwhile peasants, waifs and strays that revolution and war had brought into the cities. He regarded the countryside as virgin land in need of ‘colonising’. Peasants all needed to be taught, as quickly as possible, not only vocational skills, but also new behaviour and the urban way of life, formulate new motor habits, be given new ‘work settings’. Gastev had no time to study anything in depth, not even motor culture, but he left us the concept, and it would be a shame not to make use of it.

3

We are fortunate: all of us, not just the biologists and physiologists, can study corporeality simply because we have bodies. The anthropologist can do this through self-observation, developing those capacities in himself / herself that are now so popular in dance and motion therapy and other body-orientated practices. For nearly a century there has been a widespread discourse amongst both ‘anthropologists’ and ‘anthropogenicists’ in which we find terms such as ‘the kinetic intellect’ and ‘the mindful body’, and so forth, while *mindfulness* is regarded as a goal, a desirable characteristic.

In Russian, as in other languages, there is ever more talk about *mysledeyatel'nost* ['thought-activity'], *mysl-chuvstvo* ['thought-feeling'] and *mudrost tela* ['the wisdom of the body'], that is, yet again, the awareness of one's own body, bodily, or 'motor' intellect.

4

Firstly, new technologies introduce *a new motor culture*, new gestures, or, to use Marcel Mauss's expression, *techniques du corps*. For example, in order to enlarge an image on the screen of your smartphone, you spread it with your fingers. On some smartphones, if you are typing text, you can touch the first letter of the word, and then move your finger to the last letter, and the smartphone will type the whole word. The Apple Corporation has already taken out a patent on the *Swype keyboard* controlled by movements of the finger from the first letter to the last. When gestures for the use of digital technology, or others, are patented, they are included in the process of *commercialisation*, and participate in the capitalist economy. On the one hand motor culture is intimate, but on the other, like everything else, it is subject to standardisation and exploitation.

Secondly, new technologies confirm the thesis that *the body is always a medium*. It is our main tool; we use it to do everything that we do. (One might object to this that the 'brain-computer interface' does exist, as it were direct control, 'by the power of thought', from the brain to the object via the computer. When, for example, a paralysed person looks at a glass of water and wants to have it, his / her brain sends a signal to the computer via electrodes and then a robot device brings the glass to him / her. However, these interfaces are still at the experimental stage: they are very hard to use, and patients require lengthy training before they can send the right signals to the computer and finally get their drink of water.) When we interpret the human being mediatively, we understand the body more and more as *constructed*. The constructed body begins with the simplest of technical adaptations — the mirror. Up to the age of two, a child takes his / her reflection in the mirror to be another child and does not recognise himself / herself. (S)he begins to recognise himself / herself through the image of the other, and (s)he has intermediaries / media in order to understand that (s)he has a body. His / her own body and its reflection in the mirror are a constructed virtual object obtained by a combination of different ideas and images, real and imaginary. When we look in the mirror, we often react to our image emotionally — we are displeased, or, conversely, pleased with what we see. In the process the real image always collides within us with the ideal, virtual image, with the person we want to be. The practice of the selfie is connected with this, because this is a constant work at bringing our real image closer to the ideal, to our virtual body, our virtual 'I'. There are no grounds for thinking that, as biotechnologies develop, this work will come to a stop: quite the reverse.

Not long ago the term ‘net literature’ came into being to denote literature that exists exclusively on line. By analogy we could create the term ‘net body’. In some sense the body is always on the net, because it is included in various practices, mediative and otherwise. The snag is that we also get the body directly, immediately, through our inner sensations and experiences. We have, recently, been transferring our bodies step by step into media space, and we are aware that, both in this space and in general, our body is not just an object or a thing, but a very complex configuration. So complex, that there will always be something for the anthropologists of the future to do and make sense of.

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1

If we are to speak of the role and function of anthropology, it seems to me that currently there is nothing conceptually new: we have the same comparative-descriptive research, critical works, applied research and various combinations of the above. But there are interesting tendencies, which, I think, are having a substantial effect on the agenda for contemporary research into the body and technology, and also on the interaction between anthropology and other disciplines within the framework of that research.

The first of these is the transition from research into individual aspects to integrated experience, the return of the ethnographic method to its classical form, which presupposes an ‘integrated method’ and ‘sensitivity to the context’ [Stewart 1998]. Here, even at the planning stage, we can observe an evident turning-back from largely digital research towards integrated research (see, for example: [Hine 2015; Pink et al. 2016; Hjorth et al. 2017], etc.), and thus a new space

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is found for the body and bodily experience. In order to describe integrated experience anthropologists are finding theoretical groundings in philosophy, for example phenomenology [Boellstorff 2011], methods of conveying bodily sensory experience in art,¹ etc. In turn, collections of articles on the body represent an attempt to translate the diversity of the bodily experience of modern man in all its combinations, including experience of interaction with technologies [Mascia-Lees 2011]. In such a way anthropology is continuing to develop methodologically, coming into contact, according to the situation, with other disciplines, incorporating their tools and potential, and so to claim to study the integral experience of the interaction between humanity and technology, including technosensory experience.

Secondly, one would like to point out the noticeable growth in anthropologists' interest in applied research. Certainly, applied anthropology has existed for a long time in international practice, and there are associations and conferences and anthropologists who are on the payroll of public-sector bodies and businesses. *Advocacy* — the culture of civic involvement by anthropologists — is not a new departure either. But it is now that the attempt to find a practical use for anthropology is gathering strength, thanks to the need for the majority of young scholars to find their place and their funding in a changing world, in which the academic system is undergoing painful transformations and 80% of graduates are unable to find permanent employment.² The professional community first needs to reconvince itself, and then everybody else, that '*Anthropology matters!*'³ As an example of the applied turn within actual research connected with the body and technologies, one may cite anthropologist Daniel Miller's current project: 'We will combine an intellectual challenge of understanding the impact of new media on the contemporary nature of ageing with an applied challenge to use this knowledge to help make mHealth (mobile health) interventions more effective.'⁴

In the Russian experience there does not seem to have been any great shift of the tectonic plates. The reason for this may lie in the lack of any systemic contacts with international scholarship. Except for a few research centres, in our country anthropology, as far as its interests are concerned, is still often ethnology, and attempts at

¹ Visual Research Network. Creative Image: Ways of Seeing, Representing and Reshaping Reality. <<https://networks.h-net.org/node/73374/announcements/1519975/vrn-residency-conference-creative-image-ways-seeing>>; Ethnographic Terminalia. Chicago 2013. <<http://ethnographicterminalia.org/chicago>>.

² By which we mean tenure-track positions (cf. 'Academic Precarity in American Anthropology: A Forum', *Cultural Anthropology*. <<https://culanth.org/fieldsights/series/academic-precarity-in-american-anthropology-a-forum>>).

³ The name of the AAA conference in 2019.

⁴ See the UCL ASSA project website: <<https://www.ucl.ac.uk/anthropology/assa/>>.

interdisciplinary contacts and research connected with present-day technological experience are met with questions and incomprehension. This also applies to research into the body. ‘Tell me, which ethnic group is it whose body you are studying on the internet?’ The body, it seems, is not interesting outside politics, outside its ethnic affinities, the rare exception being physical anthropology with its modernist methods that everyone understands, which are regarded as more scientific than the methods of modern social research. We shall hope that with time this situation will change.

The habit of according bodily experience a lower priority than conceptual experience, and also of dividing experience into real and virtual, body and technology, is not only that of modern scholars. As one participant in an Online School of Internet Research¹ put it, the body and the internet are correlated more or less in the same way as ‘warm and scooter’ — as if they exist in separate dimensions and have no chance of meeting. In a society in which — not without the help of technology — experience continues to fragment, there are not many forces that are capable of using opposite tools. The potential ambition of modern anthropology must be to lead the interdisciplinary dialogue and restore the integrity of human experience of interaction with technology, including its bodily-sensory dimension.

2

It is supposed that modern ethnographic research must be based on field materials, but at the same time have a firm connection with theory, be ‘empirically grounded and theoretically rich’, as the organisers of international conferences put it. But the theoretical approaches frequently used for studying the interaction of the body and technology need not be anthropological in their origin — they may be philosophical, sociological, or belong to STS — and in practice the situation is one of mutual enrichment.

In my opinion, there are several approaches to the construction of bodies that are interesting, such as Annemarie Mol’s conception of the multiple body [Mol 2002] and Donna Haraway’s cyborg [Haraway 1985]. Phenomenology ([Merleau-Ponty 1945] and others) gives a first-person perspective, and so does its continuation post-phenomenology, which focuses on human relationships with technology [Ihde 1979; 1998; 2001; Verbeek 2001; 2008; Rosenberger, Verbeek 2017]. At the same time there is an understanding that texts on the theory of the body often exclude the experience of the body, they are *disembodied*. The task therefore remains of finding new methods of integrating theory and practice, and also a new language.

¹ See the independent research project of the Club of Amateurs of the Internet and Society ‘Onlaynshkola’18’: <http://clubforinternet.net/school_18>.

Besides the theoretical approaches, it seems to me that it is extremely important also to consider the organisational approaches: to study how modern research laboratories' work is organised, whether they consist of anthropologists or are interdisciplinary, how expertise is acquired, what technologies are used, etc.

3

At the present level of technological development anthropologists study transhumanists as a group of people with particular convictions, and not as modified bodies (unfortunately, at present one can only dream of modification of any significance, freezing the body in anticipation [Bernstein 2015]).

But if it is a question of the further evolution of technology, of the future of bio- and neurotechnology, it may be supposed that such projects will require of anthropologists both profound expertise in the subject field and technical skills, and as a result they will be closer to the experience of Helmreich [Helmreich 2009] or Haraway [Haraway 2008] than to the classic works of Bronisław Malinowski.

An example of anthropological research focused on complex systems of interaction between humans and technology might be research into telemedicine (see, for example: [Oudshoorn 2011; Pols 2012]) or experimental biomedicine [Song 2017]. Medical anthropology is close to STS, and there are grounds for expecting even greater interdisciplinarity: a significant part of the international 4S community (Society for Social Studies of Science) is already made up of anthropologists.

Ethics — the area where the isolation of Russian scholarship is most acutely felt — will be a most important point on the agenda.

4

It is already possible to observe in Russia that techno-optimists in the state and business are already talking about the humanities in the past tense. One can hear many speculations about the further evolution of technology and the hopes and fears associated with it. But what will the future really be like? In my opinion this is still an open question. According to Nassim Taleb's theory [Taleb 2012], new technologies, like everything new, are fragile, so let us equip ourselves with the anthropologist's most important tool — the notebook. (And, just in case, let us also learn programming and how to preach digital ethnography.)

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1

Modern technologies are becoming universal and are gradually occupying all spheres of everyday life. They are not only mediators and (co)participants in our actions, but also facilitators of a new order and a new social experience and interaction with the non-material.

The influence of information technologies on human corporeality should be taken into account, in view of the role played by the body and physiology in their development. As the history of the development of the field of human-computer interaction (HCI) shows, development was at first based on physical and psycho-physiological metrics, for example Fitts's Law or Hick's Law for the development of interfaces. Then the cognitive revolution shifted the focus from human corporeality to human cognitive potential. Attention returned to the users' physical characteristics thanks to collaboration with anthropologists: they drew attention to the diversity of users, their cultural practices and social situations.

In turn, the influence of technologies on human corporeality is discussed in psychology, philosophy, cognitive science, sociology and anthropology, and the different disciplines display different dynamics and tendencies. The range of problems discussed by anthropology, being less visionary and futurological, has to do with current experience, changes in the everyday order and the construction of new orders. The anthropology of technologies makes it possible to work with various aspects of the 'interfaces' of interaction, where human corporeality is presented in a so-called multimodal form: movement, touch, voice, orientation in space.

In our sociological project for studying socio-technical barriers (RSF no. 17-78-20164) we rely on anthropological research into corporeality in order to analyse geolocational games in a situation of public presence, interaction with speaking robot assistants, and the use of turn-stiles. It is the anthropological approach that

makes it possible to collect detailed descriptions of situations, in order to follow the dynamics of microalterations.

2

I regard as promising those approaches that work with questions that are ancillary for the analysts (though in a certain sense fundamental to the humanities); the objectification and metrics of the body for use in digital technologies, the anthropomorphisation of modern technologies, and the problem of the 'uncanny valley'. This is a research horizon for the next few decades, because it seems now that it is anthropologists who can bring order and normality to the many different new experiments in interaction with modern technologies.

The second direction is connected with the destruction and alteration of the boundaries of human corporeality, from exoskeletons to augmented reality and virtual reality, which influence the paradigms and normativity of the perception of the body, objectification and symbolification. The evolution of these technologies leads to difficulties in interpreting the experience of the user and their permissible application. Many questions end up on the agenda of technology companies or political decisions, and an anthropological perspective could standardise this sort of experience.

Finally, experiments with the body will be something for which expertise is lacking, since the developers are not engaged in the analysis of everyday experience. Such phenomena as biohacking require not only, and not so much, theoretical interpretation as detailed study at the level of everyday experience and of interaction with technologies and with the body.

3

The cognitive sciences and biotechnology are pioneering fields, practically impenetrable to the social sciences and humanities. The main reason is that the social sciences raise a multitude of ethical, legal and moral questions, to answer which requires a long time and a sufficient amount of empirical data, small data collected qualitatively from specific examples.

Medical anthropology has promoted itself as an interdisciplinary field, but at the same time it depends on the tendencies and limitations of the field in which it is working. For example, biotechnology is currently actively influencing changes in many aspects of medicine, and in this case the task of anthropology includes dealing with its technological aspects. Cognitive science, though, in its interaction with technological developments, is directed towards the solution of specific problems. The field of behavioural economics, say, recently recognised with a Nobel Prize, is a direction not only for cognitive sciences, but also for the anthropology of consciousness. The task of anthropology is to provide explanations which are not reduced to biologism

or psychology, but take account of the cultural practices and traditions that are transformed under the influence of technological evolution.

4

For the time being the future of the humanities and social sciences seems to have been set aside: in a technocratic picture of the world, the social and cultural aspects of the evolution of technologies recede into the background. Knowledge from the social sciences and humanities introduces many more unknown variables into the developers' equations, and their task is to find solutions to their problems, and not to complicate them. As a result expertise in the social sciences and humanities will, against a background of technological evolution, constantly come up against structural limitations.

However, for several decades, active attempts have been being made to put a social science / humanities accompaniment to the evolution of new technologies onto the agenda and institutionalise it, beginning with such global projects with unclear social effects as the Human Genome Project. From an STS point of view interest becomes particularly topical at times of breakdowns, failures and accidents. For this reason, the more situations and precedents there are for everyday interaction with technologies, the more threats, risks and complications to their dissemination, the more awareness there is of the need for knowledge of the social sciences and humanities.