

The present technological revolution and the emergence of postcapitalist social relations

I will address three sets of questions:

First : is there a technological revolution, and in this case, what does it consist of ?

Second: is there currently an emergence of a new type of social relations because of this revolution ?

Third question: what consequences such a reality may have for a revolutionary perspective ?

Let's start with the first question : *is there a technological or industrial revolution in progress and, if it's the case, what does it consist of ?*

The industrial revolution concept first appears mainly in Arnold Toynbee and Engels. It is primarily used to describe the upheavals of the late eighteenth and nineteenth century. It is the affirmation of capitalism, the industrialization of Great-Britain, of Europe and the United States. But beyond this specific reality, today it's a more general concept, which is frequently used. Basically we can say that it means a major upheaval of the techniques and means of production, but with the specificity that these changes have an impact on almost all aspects of economic and social life. There are constantly technological changes in capitalism and some of them disrupt important specific aspects, but in reality we can only speak of a technological or industrial revolution when the upheavals caused concern most aspects of economic and social life in general. In this sense we can say that there have been so far two major technological revolutions in capitalism. The first began in the late eighteenth century with the steam engine, railways, etc. The second is electricity, which appeared straddling the nineteenth and twentieth centuries.

Today, can we speak of a revolution with the new information and communication technologies (NICTs) ? I will address the question by distinguishing two components : information and communication.

Concerning information and computing, what is new is essentially the generalization of the use of computers and microcomputers, which make computing power available at an individual level. At the base are microprocessors. The importance of the advance relating to computers twofold. The first aspect is the qualitative leap that takes place in the role of machines. These are no longer just a tool, an appendage of man's hand, but objects which can replace humans in an increasing number of tasks. They may in particular reason, make logical reasoning suites ; and decisions according to predetermined criteria – something huge that barely existed in previous machines. The second aspect is the fact that this machine can practically reproduce the five human senses : sight, (for example, computers can recognize a face), hearing, touch and, recently and increasingly, taste and smell. Thus we can have machines that can make decisions according to criteria based on the perception of reality through the five senses. This is a qualitative leap in terms of progress of machinery and means of production.

A parenthesis about this. About twelve years ago, during a debate in the “International Discussion Network” about the reality or not of a technological revolution, “Robin Goodfellow” said there was nothing really new ; that all we were witnessing had already been described by Marx in “Capital” when he addressed the issue of machines and automation. Yes, if we want we can find in Marx a theoretical framework including the development of automation. But Marx could hardly imagine what a computer could be and the power of its abilities. Besides, it is useless to try at all cost to fit any new reality into the straitjacket of past writings, however brilliant they may be. It is obvious that there is a qualitative leap in the handling and use of information.

That's the first aspect of the progress achieved by information technologies (IT).

The second major aspect is the explosion of what can be called scanning or digitalizing goods. The digital form is a text consisting essentially of 1 and 0. With it, goods can be shaped into this form, as can *consumer goods*, films, paintings, music or games... for example. But also *production goods*, such as software, which can control an automated car assembly line. Such software, even if it costs millions of working hours to produce, can be digitalized in a few IT discs. But digital goods have a specific feature which could be deemed "magic" : they can be reproduced at virtually no cost. Once created, digital goods are not subject to shortage. Unless of course it is one imposed by force, such as a *copyright*. No words can describe this feature. One could say that these are "unshortageable" goods. It's as if a ton of oil, once extracted, could burn forever. Or as if the most complex industrial plants could be reproduced with a mouse click. Again, it's a huge upheaval, the importance of which can hardly be underestimated, especially by those whose perspective is the advent of a non-market society, a society without money, based on gratuitousness. The development of free reproducible consumption and production goods is a key factor for a society of abundance, a society of "sufficiency" in which commodities exchange can be eliminated.

Others claim that this is nothing new, since it was already the case for science. For example, a lot of mathematical theorems have existed since antiquity and can still be used and copied with no charge. Which is true. The problem is that, between a mathematical theorem or a law of physics and a concrete means of production, there is a long way to go. We are dealing here with production and consumption means that are immediately usable. There is a real break with what knowledge and its reproducibility could be before.

I would like to digress here on three-dimensional printers. Their number and capacity explode at the same time as the price of some of them decreases to the point of making them relatively accessible even to an individual. They are printers that deposit the material layer by layer to produce three-dimensional objects by accumulation. The RepRap project, for example, aims to create a three-dimensional printer capable of self-replicating, by printing all the parts that compose it. What is special about these new machines is that the production process is much more dependent on the software used than on machines' own material properties. And software is inherently a quasi-free, reproducible digital good. It's therefore a means to dramatically increase, in the production process, the quantity of goods that can avoid shortage.

That was the "information" aspect of the upheavals brought about by the NICT revolution : the emergence of intelligent machines capable of replacing humans in a growing number of tasks and the multiplication of free reproducible digital goods.

The second element is communication, the center of which is of course the internet. Everyone is more or less familiar with the history of the internet. 1969-1972 saw the rise of Arpanet, the result of academic research encouraged and partially financed by the US military. Originally, it was a system to interconnect the computers of some universities in the United States, but the mode of communication, unlike the telephone's via a single, continuous channel, relied on a network of different paths. For this, the data was transmitted in packets with a destination address. The system does not need to have a hub and can operate even in the event of almost total destruction of the network. The military soon showed a keen interest in the system as a way to securely connect various defense systems. The internet has the unique specificity of not requiring centralization.

Since the division of society into classes, almost all forms of social organization in history have been "vertical", based on a principle of more or less centralized hierarchy. Here is a way to horizontal communication, non-hierarchical, at least not in the conventional sense of hierarchy. And it will have unimaginable consequences. We are still far from knowing all the consequences of this innovation. One of the first things worth noting is that its form of organization resembles the human brain, in which any neuron can be directly linked to any other in an infinite number of combinations. At any given time, one point in the network is as important as any of the others. This is where the Peer to Peer concept arises, i.e. communication "among peers", which allows partners to communicate with one another without a center or hierarchies. It is totally different from all the structures in which humankind has developed thus far.

It is often said that the internet is a new "medium". But if we want to really understand what the internet is

we must first realize that it is almost the reverse of the media. The media developed especially from the 1920s and 1930s, so that the State could, directly or indirectly, address each individual in the population. Cheap radios were available, and television would follow later. The center has unidirectional access to the public. A good illustration is the picture for the music label "His Master's Voice" (RCA Victor in the US), showing a dog listening to a mechanical gramophone. The internet makes it possible to break this monopoly because communication can be in all directions, inter-active. Any internet user can in principle address any other human beings who have an internet access. This is not a dog listening passively to a gramophone. It is an anti-media that is created.

Moreover, it paves the way for near-ubiquity : data, any digital good can be transmitted virtually at the speed of light across the planet. Beyond all the characteristics of digital goods we have mentioned, we can add this sort of ubiquity, this possibility of being made widely available virtually immediately.

This combination of characteristics of digital goods and the internet generates an unprecedented productive and communicative power that disrupts all aspects of social life. And, in my opinion, we are certainly at the very beginning of these upheavals.

These changes sometimes occur at exponential speed. Some figures : when, in 2000-2001, we had discussions on the importance of the nascent internet, it was common to hear that it was just a gimmick of no importance, strictly for the amusement of the petty bourgeois who could afford a personal computer. At that time, it is true, the development of internet access was still in its infancy. Since then we have witnessed an explosion. According to statistics for 2012, while the world population is just over seven billion, there were already 2.4 billion people who were "users". A "user" is not only the owner of a computer with internet, but also anyone who, in one way or another, has regular access to the internet. This may be at work, in public places, in the family circle, among friends, etc. The continent where there is the largest number of internet users is now Asia, with China front row. The average penetration rate in the world reached 34 %, one human being out of three. It was six times lower in 2000. This is an average that covers very different situations. At the level of continents, it is in North America where the rate is the highest with 80 %, but it is only 16 % in Africa. If we look at the level of countries, the rate is almost 97 % in Norway or Iceland, nearly 80 % in France or South Korea, 40 % in China, but 4 % in the Ivory Coast (again in 2012) (1). These inequalities express differences in economic development, but whatever they may be, it is obvious that the expansion of internet access remains explosive and is very far from complete. What is especially remarkable is how it has become very rare today to find in the advanced countries any field of production or distribution which does not deal with digital goods and internet.

Therefore it is not "a small technical change with no consequences". It is a major upheaval at the level of social production and even at the level of everyone's everyday life. In this sense the term industrial revolution or technological revolution is not usurped. It is as important an upheaval as the one we experienced with the steam engine in the nineteenth century or with electricity. And if you think about it, this may be as important an upheaval as the passage from the Paleolithic to the Neolithic.

That was for the first question about the technological revolution. The second concerns the question : *is there currently an emergence of a new type of social relations because of this revolution ? What consequences this revolution has already had in social relations and, more specifically, can we see an emergence of germs of a new mode of production ?*

All this new productive power that develops has "naturally" created relationships between producers, and between producers and consumers, which take advantage of all the features of this revolution.

However, the capitalist logic does not allow a full development of this new power. On the contrary, it is a hindrance. Instead of private property, instead of market exchange, instead of hierarchical structures, we will realize very quickly that sharing, networking, setting in common, prove far more effective. This implies that we will see a general dynamic of setting in common. In English we speak of "commons", the old medieval term, common goods. This sharing trend materializes on three levels, in three dimensions.

The first level is sharing, pooling of digital goods.

It appears very quickly, as soon as the internet exists. Systems multiply that allow to share software, design plans, music, pictures, films, etc., simply because it costs almost nothing and it has the advantage that it's not because you give a film that you are deprived of it. It is much easier to be generous when you do not lose what you give. Much has been said about gift economy, referring to Mauss, etc., to describe these new forms of sharing. But it is not the case. In the classic gift we lose what we give and expect a return compensation. This is not the case with sharing digital goods.

The tendency towards a development of sharing, in total opposition to the capitalist logic of *copyright*, ruined part of the music industry, it is upsetting the newspaper and printing industry. There were lots of conflicts, as for example the reactions from music majors, banning Napster, etc. It's a real war, but a war in which sharing has grown steadily.

The second form of sharing, probably the most important, is the pooling of efforts in order to achieve a common goal. There are thousands of examples, but the most remarkable are, first, free software, of which Linux is the best known and, second, encyclopedias such as Wikipedia.

Free software appears since the 1980s, especially with the creation of GNU and the Free Software Foundation by Richard Stallman. He tells an anecdote which partly explains his original concern. It all starts because a Xerox photocopier in his laboratory does not work well. Seeing that this is a programming problem he wants to correct the driver software. But he faces the impossibility of having access to the its code, much less of modifying it. He deduces the need to create software with accessible code, editable and reusable by all. This results in the creation of the GPL, the General Public License, an officially registered license, which gives software the ability to be used free of charge, to have an accessible and modifiable code. Besides, modified software can in turn be distributed free. This is called "copyleft". Bill Gates reacts with his famous statement condemning all this as "communism". In fact it is the most efficient, the most rational way to utilize the qualities of the products of the new technological revolution

Stallman is the most famous character, but he is part of a whole movement that develops spontaneously among programmers. They are called "hackers". The press often uses this word to designate "crackers" whose specialty is to blow security systems supposed to protect institutional sites or proprietary software. In fact hacker generally defines passionate programmers and operators of computers. These are people who act for pleasure, who want their creations to be distributed for free and are even more satisfied when their works are taken and used. They thus develop a new ethic. The Finnish philosopher Pekka Himanen wrote in 2001 a very good book which describes and analysis it: *The hacker ethic and the spirit of the era of information*, referring to Max Weber's book of 1905, *The Protestant Ethic and the Spirit of capitalism*. At the base of this ethic there are three simple principles: the first is that the "work", or rather the productive activity, writing software, must be voluntary, free, for fun; the second is that the organization of this activity must be collaborative, with no vertical hierarchy; the third is that the final product must be freely accessible to all, for free.

Another remarkable example of sharing by pooling of effort is that of encyclopedias like Wikipedia. It is the voluntary sharing of knowledge of tens of thousands of people throughout the planet in more than a hundred languages, through a collaboratively organized activity and resulting in a product which, like free software, is available free of charge for all. At first they wanted to create a "filtered" Wikipedia but the idea was quickly abandoned. There was also an attempt called Nupedia including only articles filtered by reading committees with the idea of doing something more "strict" than Wikipedia. It quickly ended in failure. The great innovation of Wikipedia was to trust the participants themselves to correct, improve and protect the contributions. In the mid-2000s it was estimated that there were near 7 % of "vandal" contributions, seeking only to sabotage the collective work. But there were also 93 % of participants who were not "vandals", many of whom were careful to counteract the destructive actions. The results are remarkable. For example, it is estimated that in the English version of Wikipedia, the scientific parts are now more comprehensive and stringent than in the venerable Encyclopædia Britannica. It is an important reality when considering what a future society could be. This is a practical demonstration that we don't need specialized police apparatus to

"protect" the proper functioning of a project, even a very complex one, as long as a vast majority of participants agree on the essentials. A figure in passing : there are now two and a half million articles in the English version of Wikipedia. [five million in 2015].
That was for this second form of sharing.

To understand the reality of this new way of producing, Yochai Benkler, a US academic who teaches at Harvard Law School, created the concept of "*Commons based Peer Production*", Peer Production on the basis of the community.

In fact this Peer Production is only the most advanced form of a wider collaborative attitude characterized by the fact that, thanks to new technology, things can be made in a much more collective way, from bottom to top and not the contrary. The combination of internet and free digital goods facilitated the emergence of a general dynamic of collaboration and self-organization.

We can wonder : is this "Peer Production" a secondary, short lived phenomenon, about to be crushed by the pervasive capitalist market logic ? Or does it announce a new world ? Is Peer Production a "germ" of a non-market society, a "communist" society – to use the "classic" term ? We can consider that it is already, partly, a mode of production since it defines how to cooperate to produce and how to distribute the results of production. However there is still a lack at this level: it still works, essentially, in the field of digital goods. We don't see yet Peer Production at the material level of production such as agriculture or steel, resorting to physical assets such as land, minerals, etc. A real mode of production is first of all a relation of man with nature, in every sense, and therefore with material goods. In this sense it is more correct to speak of "germs" of a new mode of production rather than mode of production in the full sense. For these germs to be transformed into a mode of production in the full sense of the term, for this system to be extended to all material assets, this will require... a social revolution. The material means of production, land, factories, will have to be taken and pooled in order to apply the principles of Peer Production, of sharing economy, to all of society.

That said, some of this has already begun. And this leads us to *the third form of sharing* induced by the technological revolution. After the sharing of digital goods, after the pooling of efforts, we are seeing, even if it is still in very embryonic form, the *sharing of computer hardware means*.

I mention only two examples but they are very significant. American universities are again behind these initiatives. The first is the SETI, launched by the University of Berkeley, whose goal is the continuation of the search for extraterrestrial intelligence, abandoned by the NASA for budgetary reasons under the Bush administration. The objective is to analyze by computer billions of data constituted by recordings of radio waves received by electronic telescopes. The required calculation power is gigantic. The system consists in allowing personal computers to share with Berkeley a part of their computing power. By connecting to the SETI site, contributors receive internet data packets which are analyzed by their personal computer and the results returned to the source. By early 2013, there were more than 13 million participants (2).

Another nice example is in Stanford University. Its name is Folding. It is also a distributed computing project "whose aim is to study protein folding in various temperature and pressure configurations to better understand this process and to draw useful knowledge that could, among other things, allow the manufacture of new drugs, especially against Alzheimer's disease, sickle cell disease and certain types of cancer." (3)
In both examples we are seeing a sharing of material goods. It is millions of personal computers which pool their computing power without market exchange relations.

All these forms of sharing which concern digital goods, efforts in cooperation and material goods, allow us to speak of the emergence of germs of a new way of life, a new society whose bases are non-market, "communist" in the true sense.

Before carrying on, on the consequences of such a reality for the revolutionary project (i.e. the project of a postcapitalist society), I would like to answer to two types of arguments that are often opposed to the analysis I have just presented.

The first one says that even if it's true that we are seeing the appearance of non-market relations, it is not a new phenomenon and anyway they are not at all dominant in society. They are born in a capitalist society dominated by nasty foxes and awful octopuses which will take care to devour and dissolve these human relations within the logic of capital.

It is true that there is a real resistance to the development of these germs. Schematically speaking we can say that this resistance can take two forms. One that we could call "warrior" or "violent", which results for example in the criminal prosecution of persons who do not respect the *copyright*. But besides that, we have another form which results in a real phenomenon of symbiosis. For capitalists it's obviously a good deal to use the collective work provided free of charge by hackers or voluntary contributors. The IBM company, for example, understood this very quickly. Faced with the problem of becoming too dependent on Microsoft software for the operation of its machines, IBM adopted Linux. It even started to contribute to its improvement. Its new marketing argument : "Buy our machines, the software is virtually free." Isn't it a paradox to see a major capitalist enterprise pay part of its staff to maintain and improve a good which is freely accessible to all ? There is a sort of symbiosis between two logics which are totally different. We see the same with companies like Google. The Android software for example, which allows the operation of smartphones and tablets, is based on Linux. Capitalist companies derive a profit exploiting all this collective and free labor. But all is not negative in this reality. The development of Linux, as well as the development of gratuitousness is encouraged by the capitalist greed. The new logic, at least in some cases, is stimulated by the logic of the old society.

This is a paradoxical phenomenon that we can see in history, in transitions between societies, between the different modes of production which existed in the past. I will take two examples. First the transition from feudalism to capitalism. Within the feudal society, the relations between feudal lords and the flourishing bourgeois cities went through the same dialectic. The absolute monarchy in France, for example, is more and more obliged to use the productive and financial power of the bourgeois cities to assert its power over the great lords of the kingdom, or to face other monarchies. Cities provide to lords, often at war with each other, two major elements: weapons, made more effective and numerous by the introduction of capitalist relations ; and money through the banks. That's how we see lords and especially kings grant special rights to certain cities in exchange for their support. However, ultimately, it is the cities that will behead kings. But for centuries, and under the pressure of war necessities, it was the kings, the forces of the old society, that were brought to encourage, stimulate, the germs of the new society.

I cannot deal here with the various aspects of what has been called the "germ-form theory" particularly developed within the German group Oekonux, by Stephan Meretz and Stephan Merten. Through an analogy with animal phylogeny, this theory defines five stages in the process that drives the germs of a new mode of production to pass from a very minor form within the old society to the form of dominant mode of production. I only want to point out here one of its fundamental ideas, that one of the conditions for this process to succeed is that, at a certain moment, the germs of the new mode of production become useful or even indispensable to the survival of the old mode of production. If this usefulness does not exist, the germs do not have the strength to become some day "dominant".

Another very telling example is the development of "colonat" (4) in the slavery practicing Roman Empire. *Colonat* is a germ form of serfdom, the relation which will become dominant in feudalism. Unlike the slave, the colon is a "free" man. He is very often an emancipated slave, sometimes after years of loyal service. He remains attached to the land in which he works and is transferred with it upon sale. But he is no longer treated like an animal. He rewards the owner of the land he works in with a share of the harvest and works at his service, also submitted to other obligations. He has the right to have a real family and his children can succeed him in the culture of the same land, which was not generally the case for slaves, and which is a powerful stimulant to work. In agriculture this system is more productive than slavery.

Colonat appears in the Roman Empire since the first century, but it is especially after the crisis of the third century, in the Lower Empire, that it really develops very much. A development that will even be promoted by some emperors. It is obviously not stimulated to accelerate the decline of the old system, since slavery

persists and even thrives in sectors other than agriculture, but because it enriches and strengthens the ruling class of the old society.

So, if it can be revolting to see Google or IBM enjoy with greed the germs of the new society emerging today, paradoxically, this is the ransom to pay for these germs to develop.

The second argument against the idea of "germs" to which I would like to answer, says that even if we accept the non-market nature of these germs, they only exist in a particular area of social production, the digital goods. In the world of material goods, not reproducible free of charge, there is little or nothing. Yet it is this last area which ultimately is decisive. But here again history is illuminating. We can find a similar reality in both historical transitions we have already mentioned. The replacement of slavery by the *colonat* in the Lower Empire and in the early Middle Ages did not occur in all the sectors of production but essentially in agriculture. In mines, in the areas of domestic or personal services for example, slavery reigns. It will take centuries for the *colonat* to become dominant, under the form of serfdom. We find a similar reality in the development of germs of capitalism within the feudal society, in which the bulk of the economic activity is agriculture. Agriculture holds the overwhelming majority of the population. However capitalist germs grow practically on the margins of this activity in two very specific areas : armaments and luxury goods. For centuries capitalist relations develop without really penetrating agriculture, main social economic activity. This will not prevent them from becoming dominant and finally submitting to their logic the whole of social life.

That is why the fact that today the non-market relations develop mainly in the field of digital goods, does not imply that these relations cannot generalize one day to the whole of social life.

We are currently witnessing two completely contradictory movements. On one side there is further penetration of capitalist market relations into all the fields of social life, and on the other side there is the opposite movement towards gratuitousness, towards collaborative production with no profit and no market exchange. We are entering a period of duality, increasingly marked by the opposition between these two logics.

I think we can say that today the development of gratuitousness, of Peer Production, plays a role similar to the role played by the development of money and market exchanges within feudalism. When serfs begin to have to pay their lord not in kind but in money, the relation is still feudal, but the use of money is already undermining the foundations of this relation.

Today gratuitousness and voluntary collaboration play this role of undermining the capitalist society... even if we know that it can take very long.

And this leads us to the third issue of this presentation: *what consequences such a reality may have for a revolutionary perspective and class struggle ?*

In my answer I'll make a difference between two time scales: long term and short term.

In the long term, the main contribution lies in the development of the visibility of the revolutionary project. The idea that a new society without money, without market exchange, without exploitation begins to be perceived as possible. And this not out of books or speeches but in a social practice that is developing before our eyes. Historical experience underlines the importance of this factor : when we try to explain the failure of communist revolutionary attempts of the past, the Paris Commune of 1871, the revolutionary wave of 1917-1923 in the defeated countries in World War I, for example, or the limits encountered by the most radical movements of the late 1960s and 1970s, I think that much of the answer lies in the inability of these movements to have a concrete perspective, other than a huge blur. In 1917-1923 revolutionaries had little to put in their mouths as a project. Apart from the texts of "utopians", there was the social democratic program written by Kautsky in 1892 which defended in fact state capitalism. It is very difficult to make a revolution when you don't see clearly where you are going to. It's rather easy to find what you reject, but you don't risk your life and your children's in a movement if you don't have at least some concrete idea of a positive goal. That's why the most revolutionary forces in these movements of the past quickly turned into a minority. I think the importance of this fundamental weakness will diminish as we will

see new non-market practices develop and penetrate the material areas of production, making more visible what could be a postcapitalist society.

In the short term there are also effects. If we try to explain movements such as the *Indignados* in Spain and *Occupy* in the US, we may wonder where do their ideas come from, why are they so obsessed with the power of the assemblies, the rejection of hierarchies and of "representatives". Everyday journalists used to ask to meet their chiefs, the leaders of the movement, and systematically the answer was that there were none. It was said that they took up the principles of workers' democracy as reflected in the Paris Commune, the early soviets in Russia or the Workers Councils in Germany in 1918. But besides the fact that the mechanisms were not exactly the same, undoubtedly the overwhelming majority of the participants in these movements did not have the slightest historical knowledge on this issue. Their practices did not derive from a historical tradition but from a concrete practice, the practice they have on the internet and social networks. In the internet hierarchies are ineffective. Market relations are easily questioned. Both in Puerta del Sol in Madrid and at Zuccotti Park in New York, it was forbidden to sell anything. Everything had to be free. In Madrid many homeless people chose to be there to be freely fed. Some were included in the kitchens. More recently, during a student movement in Bologna (Italy), against the government's austerity policy, they claimed the creation of "non market spaces".

In conclusion we can say that there is a profound ongoing process and that even if it will be long and difficult, even if the working class is now often paralyzed, terrorized by the reality and threat of unemployment, there are germs of future that develop. This entails and will entail an evolution in consciences. Even if it were to be a very long-term process, it would be wrong and crazy to ignore or underestimate its potential for the future and for the prospect of a "communist" (in the true sense) revolution.

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Notes:

1. Source for statistics on the internet: <http://www.internetworldstats.com>.
2. <http://setiathome.berkeley.edu/>; http://fr.wikipedia.org/wiki/Search_for_Extra_Terrestrial_Intelligence.
3. <http://folding.stanford.edu/>; <http://fr.wikipedia.org/wiki/Folding@home>.
4. *Colonat* is a concept of Roman law. The *colonat* gradually replaced slavery during Late Antiquity. https://fr.wikipedia.org/wiki/Colonat_partiaire