

**THE ANTHROPOCENE AND ANTHROPOCENIA  
– a few details of a changing world –**

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**Abstract:**

*What influence man has had on the climate? We think mainly of major technological options, the stages of its history, the "Seals" negative global environmental crisis (not just CO2 emissions). Only "modernity" can be accused of harming the environment today, tomorrow? The process is more complicated, involving for centuries the economic and social, politics, biology, geography, demography and others. Such issues dealing "Anthropocene" and "Anthropocene". We will refer below.*

**Keywords:** *development, influence, effects, environmental crisis, human footprints on the planet.*

**Introduction**

The 21st UN climate Conference held in Paris, some time ago (30 November-11 December 2015), presented at least two meanings. First, it tried - successful test in doubt - to get a general, universal agreement that reduces total greenhouse gas emissions. Second: the large number of UN Conferences on climate reveals at least the difficulty of human intervention, even humanist, in a process in which short-term profit and a narrow focus on development still have an essential role. Surely, positive changes required and expected this way are manifest to a certain extent, but I hope they will evince as strong as possible in time: a few decades or many centuries etc. But now? They are not really beneficial to the nowadays generations. Let us, however, be optimistic. Good intentions, however, were often damaged by the actions of states, and not just "dictated" often by "international capitalists" eager to preserve some

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substantial advantages already acquired. See, for example, the US case and its particular "relationship" with the Kyoto Protocol. A "relationship" totally lame. And such statements have not been and are far from being singular. But, ultimately, man is, he will be the one who wants to correct what man, again man ruined out of ignorance and other reasons ...

... He ruined? How concretely did he ruin? How did man influence climate over time? Deep questions, with answers whose formulation requires equally profound investigations, examinations. Questions that I, in my books, in my courses in economics, economic history, the economics of sustainable development, have pursued, even if briefly, to answer since the 1980s. Environmental damage, in this case the amplification of Sahara desertification, generated by the desire to have wood for vessel construction of the Roman Empire<sup>2</sup> is one example. Then, another example would be what Horace wrote in "Epistulae": "Natura expelles furca, tamen usque recuret" ("You cast away nature, but it will return hastily")<sup>3</sup>. Or 17 centuries later, what Francis Bacon mentioned in "Novum Organum", "Nature to be commanded, must be obeyed"<sup>4</sup>. Obviously figuratively. Then, even in our time, the entropy theory of the great Romanian economist Nicholas Georgescu-Roegen (see, for example, Dan Popescu "The Universe in white - black"<sup>5</sup>, then Dan Popescu "Cornucopia - a Miracle?"<sup>6</sup> etc.) and so on... But also other more recent works<sup>7</sup> give such examples. Moreover, outside the course "Economics of sustainable development", in my volume "History of Economic Thought from antiquity to the late twentieth century", volume awarded the "P.S. Aurelian" prize of the Romanian Academy in 1999 (for the year 1997), Continent Publishing House, Sibiu - Bucharest, I have an extensive chapter entitled

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<sup>2</sup> See Dan Popescu, „Civilizație și industrie (Civilization and Industry)”, Albatros Publishing House, Bucharest, 1981, p.180

<sup>3</sup> See Dan Popescu, „Universul în alb-negru (The Universe in Black and White)”, Albatros Publishing House, Bucharest, 1987, pp.134-135.

<sup>4</sup> *Idem.*

<sup>5</sup> Dan Popescu „Universul în alb – negru (The Universe in Black and White)”, *loc.cit*

<sup>6</sup> Dan Popescu „Cornul abundenței – un miracol? (The Cornucopia – a Miracle)”, Albatros Publishing House, Bucharest, 1984.

<sup>7</sup> Dan Popescu, „Istoria gândirii economice din antichitate până la sfârșitul secolului XX (The History of Economic Thinking from Ancient Times until the end of the Twentieth Century)”, Continent Publishing House, Sibiu-Bucharest, 1999 (two united volumes), Dan Popescu, „Cetatea liberă (The Free Fortress)”, Continent PH, Sibiu-Bucharest, 2000, etc.

"Eco-development, Part of a New Paradigm. From Horace's *Epistulae* to Sustainable Development"<sup>8</sup>. Therefore, from my point of view, not just lately - well, a notion a little bit wider - broad issues of environmental damage were discussed. Despite, even, of the dense shadow cone, despite darkness, often totally undeserved, that academic subjects were and are – in our country, but not in Europe, in the major European universities - so momentous, of economic history, there existed concerns about the environmental damage in evolution. I had them myself and a few other colleagues, it is true, very few. The more meritorious efforts also taking into account the circumstances and "conjectures". In fact, research generates practical effects that are restrictive for most entrepreneurs of poor quality, it can result in huge fines and penalties, and unfortunately, these entrepreneurs are many and very influential...

... Behold, however, that today, the field researchers come together under new requirements. First, a few details<sup>9</sup>. The latest vision: atmosphere, climate, oceans, ecosystems have changed substantially in a relatively short period of time. Not few scientists argue that we have entered a new geological period, the Anthropocene, in which the evolution of the planet is dictated by human activity. At present, we can say that human population growth is also considered an environmental hazard. Man is supplying all the resources he needs from the environment. Through his activities, many ending in pollution, he has come to change the planet climate. Much has to be made, therefore...

The heating period that began about 2,000 years ago, after an ice age, was called by scientists, the Holocene (totally new). The characteristics of this period, however, are no longer found today, which is why, since the 60s, researchers began to wonder whether we have entered a new geological period. The term "Anthropocene" - given that the observed changes are related to human activity - was proposed by researcher Paul Crutzen, Nobel laureate chemist. There is currently a massive mobilization of researchers so that the Anthropocene should be formally accepted as a name for the period we are going through. In this framework, "Anthropocenia", a name proposed by me, would be the subject dealing with it.

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<sup>8</sup> Dan Popescu, „Istoria gândirii (*The History of Thinking*)”, *loc.cit.*

<sup>9</sup> Also see the opinion and quality essay required by me, among others, to the student Simona Nicoleta Gândilă, ULBS, The Economics Sciences, Accounting and Management Informatics Faculty, first year etc.

If we drill deeper, we see that in 2009, a group of 28 specialists in Environmental and Earth Sciences, led by the Swede Johan Rockström, identified "new systems of sustaining life" on earth, where if certain limits are passed, the human species is endangered. For three such systems, the limits have been exceeded. This is, first, the warming. The CO<sub>2</sub> level in the atmosphere has risen from 280 parts per million (ppm) in pre-industrial times to 387 ppm in a million today. The maximum limit of 350 ppm was exceeded some 25 years ago. From then until now, and in the future, "maintaining" such a pace, effects consisting in climate warming are being felt and will be felt, will increase. A second issue: the extinction of species. A normal rate of species extinction is 10 to one million per year. According to some calculations, at present, the rate of species extinction is 100 to one million per year, which is attributed to pollution and habitat destruction, among others, but also to some hunters - even if legally forbidden - merciless to animals, many killed for money. There are scientists who say we are witnessing the beginning - the beginning, we say - of the sixth great extinction on Earth. Finally: nitrogen fixation. Fixed nitrogen in the soil through natural processes arrive annually to 35 million. Nitrogen fertilizers used in agriculture, allow, however, that 121 million tons of nitrogen be fixed annually. That creates a ground infiltration acid and nitrogen in water, with serious harmful effects on life.

Other dangers are manifest in increased acid levels in the oceans due to CO<sub>2</sub> emissions, in the so dramatic thinning of the ozone layer due to pollution, in the rivers diversion, according to necessities of human activity, in deforestation to expand pastures and arable land, in the aerosols spread in the atmosphere by chemical pollution, etc. It is expected shortly that safety margins be surpassed in these cases as well, until about the half of this century, if things go in the same pace of ignorance and harm<sup>10</sup>.

Other details: according to the generally accepted definition, the environment is the natural environment that was and is transformed by humans. This includes relief, water, air, vegetation, soil and subsoil. They are the natural environment elements on which man has intervened through its

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<sup>10</sup> Dan Popescu, Bianca Trăușan, „*Economia Dezvoltării Durabile (The Economics of Sustainable Development)*”, Continent PH, Sibiu-Bucharest, 2004.

activities. Each element has a special role in creating the natural environment. At the same time, all processes and components are connected to each other. Thus, topography influences climate. In turn, climate, together with relief, determine the spread of vegetation and, the latter, fauna - preserves the unit called natural environment. To live better, people created settlements, cultivated land, built roads and factories, namely, they have gradually transformed the natural environment. The natural environment can be used for human support, but it must not be destroyed, or it must not be affected beyond a series of critical masses. Unfortunately, as we have shown, there are numerous examples of destruction of plants and animals, air, water, soil and subsoil pollution and damage. Most times, talking about the human impact on the environment we refer to pollution. In reality, human action far exceeds the scope of pollution and therefore, it should be more accurate to mention the many different ways of environment damage.

Roughly harmful human activities on the environment are: a) **damage to ecosystems** - forests, grasslands, lakes, rivers etc. were occupied by humans and processed according to their own needs (dams, canals, residential areas were built). Tropical deforestation led to the disappearance of half of the population here; b) **over-exploitation of biological resources** - overgrazing, exceeding hunting, deforestation reduce species diversity; c) **the environmental impact of urbanization and industrialization**, without compensatory measures is unfavorable: increases the amount of waste and emitted waste gas, water polluting etc.

Environmental pollution is made with physical, chemical, biological substances etc. In industry – it is done through emissions of toxic substances into soil, water, air (including accidental radioactive emissions); in agriculture – through the use of pesticides, chemical fertilizers; in domestic pollution - with organic waste, packaging, waste water, detergent, exceeding energy consumption; air pollution – with toxic gases, liquids and solids, powder etc. These factors proven harmful so far and that cause most damages are: sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), smog etc. All these factors are devastating for the world. Thus, we think about the greenhouse effect, the holes in the ozone layer, acid rains, melting glaciers which will lead to a rise in sea levels, more devastating storms, droughts and more. In evaluating these effects one may realize that

future is uncertain and we expect what is worse for the Earth. Earth is warming more and more, climate has become more "undisciplined", with dramatic effects on life. Mainly, humanity - well, some representatives of them - by growing demands and desires to have as much without thinking about consequences, is to be blamed. As I stated before, we experience deforestation, air pollution with various pollutants, water pollution, animals and plant extinction etc.<sup>11</sup>.

One of the most serious threats in the development process is the growing shortage of natural resources. The biggest consumers are countries like US, China, India, where requirements are growing by the day. More of such countries are forced to move from exporters into importers of natural resources and other raw materials. We can expect a depletion of essential natural resources, and this until the first half of the XXI century. Even in spite of optimistic theories on unexploited deposits... What costs will generate exploiting them? This problem is currently trying to be solved by creating biofuels, natural sources of alternative energy, such as solar and wind, which will save the planet both from global warming and the increasing lack of vital sources. "Will they be saved" until then? According to many opinions, the most feared conflict that may arise due to global warming and shortage of natural resources, is between Russia and the West. But there may be other conflicts. Certainly it will come to a competition for mineral resources in the Arctic. Ice cap melting will accelerate negative circumstances, it is possible that this conflict escalates into a real war, a "Second Cold War", this time literally over the existing resources of the Arctic ice cap.

Other hazards which will generate many problems to humanity come - and will come even more - from the deep gap between rich and poor societies. As activities in industrialized societies are one reason of global warming, those effects have even stronger negative repercussions on developing or poor countries, without resources to defend that. Regarding all these conflicts, unfortunately, too little effort is made in order to solve them<sup>12</sup>.

Specialists of global warming have already set up changes that will transform the planet in the next hundred years. These changes will be felt most

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<sup>11</sup> Dan Popescu, „Amenințări pentru secolul XXI (Twenty First Century Threats)”, *Continent PH, Sibiu-Bucharest, 2014*.

<sup>12</sup> *Idem*.

in crowded urban areas. A lack of natural resources will be felt, a decrease of water resources, in food, health will be put to hardships, there will be numerous cases of respiratory, allergy, cardiovascular and gastrointestinal diseases. To prevent these processes, extensive research arose, as well as nongovernmental institutions for environmental protection. And now, behold the Anthropocene and Anthropocenia. A big step forward. Moreover, sometimes ecologist parties were able to engage in the power structures of the state, and some of them have turned into political parties. However, for nearly a decade global warming has become the no. 1 “concern” of the world. In this regard, numerous meetings, congresses take place in which all countries of the world participate and where measures to slow global warming are being provided. Unfortunately, as I said, this happens rarely at the level required and most often without the expected results<sup>13</sup>.

Using alongside its own considerations and other considerations, those of the French researcher Jean-Baptiste Fressos, published in "L'Histoire" issued September 2015, in fact, through his object of study "Anthropocenia" deteriorating a myth: the one that explains it has to do with the rise of CO<sub>2</sub> in atmosphere threatening only after late after the onset of the industrial revolution in England, France, Germany, the US, Russia, etc. J.B. Fressos shows that we do not have a relationship between this growth, between this curve and great choices, great technology options such as industrialization, industrial agriculture, automobile, aviation, etc.; we do not have a precise relationship between the rise of CO<sub>2</sub> accumulations and large historical processes, such as imperialism, colonialism, economic globalization, wars, and on another plan fordism<sup>14</sup> etc., which means, however, a relationship cannot be determined. However, such historical categories should not be examined, in this case, only from the CO<sub>2</sub> perspective but from the perspective of evolution of other markers of the global environmental crisis, such as nitrates, phosphorus and its compounds, etc. In other words, can modernity development or "human species" in modernity as such, be accused of the environmental crisis? We shall see.

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<sup>13</sup> *Idem.*

<sup>14</sup> *Vezi J.B. Fressos, „Climat: l'Homme entre en scene”, L'Histoire, no. 415, Sept.2015; Also see the volume of Jean Baptiste Fressos et Christophe Bonneuil „L'Évenement. Antropocène, la Terre, l'histoire et nous”, Seuil, Paris, 2013*

As shown, the most serious consequences of human actions on the planet are reflected throughout the human species - it understands and feels so - affecting one in many respects. First, from the point of view of health (diseases are more frequent, more expensive treatments are needed, and difficult or impossible to treat). Then, extreme weather (storms, tornadoes, hurricanes, new phenomena) have increased natural disasters. Lastly, the use of nuclear energy (and unable yet to treat and neutralize nuclear waste), by nuclear disasters that have occurred or are likely to cause. To this, add high costs involved in climate change. A UN report estimates that adapting to climate change could cost mankind in the period 2025 - 2030, about 150 billion dollars per year. And in 2050, the amount could reach 500 billion dollars.

The UN estimated growth for 2050 is approximately 20 times higher than in 2012-2013, during which these costs amounted to 23-26 billion dollars. The money is needed to protect residents of areas where the seas and oceans level is amplifying, finance programs to reduce emissions of greenhouse gases, or to eliminate the aftermath of drought or flooding. "Poor countries will be more affected by this increase, as an increasingly higher part of these financial resources, already low, will be directed towards adaptation to climate change", stated not long ago, a senior official of the same international system<sup>15</sup>.

Therefore we have "Anthropocenia". As mentioned, an epoque on the geological time scale, an epoch that reveals and examines the footprint, in time, of the man on the planet. Certainly, as an important plan, energy mix is envisaged, in this case highlighting amounts of primary energies - animal traction, wind, hydro, coal, oil, gas, solar, nuclear - used in a society. And what can be shown, despite some efforts and especially despite some spectacular statements that were made in 2012-2013, fossil fuel represented 80% of the "bouquet" world energy. What is still huge, especially having in mind that these energies are not renewable or unlimited<sup>16</sup>. And they are used in "the games market" with great loss from the many. Say it is not so much in terms of what I did and do, but mostly in terms of what we do, what we should do.

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<sup>15</sup> *Idem*

<sup>16</sup> *J.B. Fressos, loc.cit*



... It is said often that developed countries, among others, in this case, the United States and United Kingdom, through their type of development for a good time, have generated substantial share of cumulative CO<sub>2</sub> broadcasts. It seems to me not very far from the truth, for real. Statistics show that for example in 1950, 65% of cumulative CO<sub>2</sub> resided in the United Kingdom and the United States. It is true that offering, at the time, a certain model of non-organic development pattern picked up by others long after 1950 in 1970 shows the CO<sub>2</sub> emissions of the "rest" of the world (excluding the two largest states) have exceeded such broadcasts coming from two great dominant powers in the nineteenth and twentieth centuries. As details, comparing England with France in 1914, where GDP per capita of England (generic term, in fact, in the UK) was 20% higher than in France, we can say, however, that the English were generating at the date mentioned 4 times more CO<sub>2</sub> than France. Besides England, which in 1913 had half of direct investments abroad, its shareholders oriented towards railways (40%) and, equally, a significant share towards the world. Direction was also necessary and desirable for many, but in such conditions, to virtually promoted "fossil capitalism" around the world<sup>17</sup>. The figures also show such an increase in the concentration of CO<sub>2</sub> in the atmosphere by 45% consecutively in the pre-industrial era, as a result of human activities (deforestation, the main factor up by 1900 and fossil energy combustion). After 1950, this growth is exponential, the "great acceleration" is taking place (see also A. Toffler, "Future Shock"). Naturally, the market demanded this, there was almost no control of the institutions and they cannot be found guilty but with thin arguments. Especially since the "sobering" debuted in all the major industrial countries - France, Germany, United Kingdom, United States. And all of this were evident ideas and theses, new rigorous calculations imposed across the globe.

Other details that manifest as interesting... Renewable energies (wind, hydraulic and animal traction) were not rejected. They were part of the "game". We have referred to things in this regard. For example, according to the historian David Nye American economist, quoted in the study mentioned in "l'Histoire" in the United States industrialization was based, in large part, as follows: three-quarters of American industrial power in the 1870s, was home hydraulically and in the 6 million wind turbines were operating pumps that

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<sup>17</sup> *Idem*

allowed the late nineteenth and early twentieth century, putting in "culture and modern civilization" of the American Middle-west. Actually quite remarkable... However, at the time of the Second World War until the beginning of 1950, the model of the "solar house" already won the match in the United States. In Florida and California, most of the houses were at that time, still equipped with solar heating and hot water. Trends are found in other countries - economies, but unfortunately for us today, were not followed and amplified. Then, however, it was hard to believe and predict what will be today ...

Another question that arises: why, however, coal has become the main energy source as the first industrial era, although even then, hydropower was quoted cheaper anyway? Beyond the criteria of the great energy potential of coal, which mentions the history of Swedish economist Andreas Malm seems worthy of notice. Especially addressing a sociological perspective and political science, Malm emphasizes that to develop energy water industries English, in case patrons had to invest jointly to build such dams, which would have meant practically a collective management of energy resources. When they would open a valve they had to make sure that the upstream plant would have left enough energy plant downstream. Not terribly attractive to individual entrepreneurs who were running away - and run today, sometimes incorrectly, from the word "collective" and what it represents<sup>18</sup>. It is, moreover, the problem with which classical entrepreneurs on all rivers have been confronted with since the Middle Ages. However, if an industrialist had considered necessary to develop his business and had invested in new machinery, would he surely have achieved, not only at exorbitant prices, a most significant hydraulic share? Probably not. Or coal, the resource market and its specifics as such did not require nor impose such a collective discipline - a collective discipline which currently proves imperative in the light of global control or not, of coal pollution.

However, at the time, and even today, to an extent, coal, regarding not only the operation but also its use, flexibility and individual management, better accommodated with capitalist mentality of the time and nowadays. To the proliferation of industrial coal, a mentality - already "mentality" - contributed that in the world, coal resources were and are huge, envisaging for

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<sup>18</sup> *Idem*

many, many years, on very long-term, based on this resource, a safe and cheap increase of economy. Cheap, of course, considering the miserable wages that miners and their auxiliaries were paid with - children 6-7 years on and many women, even within advanced pregnancy. This is shown to us not only by Marx in Volume I of "The Capital", but also by the great English novelist AJ Cronin ("Under the stars") and prior to this by the great Emil Zola in his famous novel "Germinal" preceded, not many years ago by Gerard Depardieu in the role of the miner Maheu, Miou-Miou, Laurent Terzieff, the French have made a remarkable film, even if very "naturalistic" having Zola's literary compliance seal. Today things have changed but negative accumulations in time can hardly be eliminated or at least neutralized ...

Here is another pertinent question within the study in the journal mentioned, question which, moreover, we asked ourselves three decades ago (Dan Popescu, the Universe in Black and White)<sup>19</sup>. Namely, how do we explain the "petrol fueling" of Western societies, especially in the second half of the twentieth century? And to which I and those in the magazine have tried to provide answers relevant enough. And what would it be? Here, on the one hand, the complex concept of "energy transition" - concept sufficiently clear in our opinion - oil does not become a substitute for coal, but today, for example, the world's coal use has not ceased to grow, nowadays coal being used mostly. And then? Of course, crude oil, gasoline submit their specific uses that cannot be met by coal. We have the answer. Insufficient, but because, in terms of equivalent energy, crude oil costs, constantly, much more than coal. However, oil has gone from a poor percentage of the global energy mix in 1920 to over 60% and to even more detail in the 1970. How do we detail?

At first, car outlet (later, and aircraft), the main factor in the oil industry. American historians, and not just them, including 1-2 Romanians, show that here, along with the vast and undeniable utility vehicle, there is a political choice encouraged by the American elite. In fact, "individual car and the house outside the city are, by their customizing to the individual, important fortifications against aggressive communism"<sup>20</sup>, which, in fact, towards the end of the period, from the perspective of the modern world, began to develop a certain adaptation. However, even in the 1920s and then 2/3 of the cars were

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<sup>19</sup> Dan Popescu, „Universul în alb-negru (The Universe in Black in White)”, Albatros PH, Bucharest, 1987.

<sup>20</sup> J.B. Fressos, *loc.cit*

and are today purchased mainly by consumer credit, which induced a certain worker-employee discipline title, making the place work "sedentary"...

The Englishman Timothy Mitchell offers further on an explanation, a hyper-political vision the of the issue, especially in his book "Coal Democracy"<sup>21</sup>. Here, coal chain develops, calls to compulsory labor segments important at all levels, from extraction to transportation. Typically, people who have become highly organized, and made industrial capitalism vulnerable to strikes. The mining unions have held and still hold, here and there, in their hands, the energy supply to the economy. Social gains of the late nineteenth century (limitation of working hours, social security, universal male suffrage, etc.) are, in the opinion of Timothy Mitchel reportable greatly to this "democracy coal". Or oil, has had mainly a geopolitical sense. "United States with the Marshall Plan, incited strong Western European countries actually tilt towards oil (buying American oil subsidized investments and refineries, diesel engines, etc.) thus managing, among others, a certain marginalization of dangerous mining unionism flirting with communism"<sup>22</sup>, in fact bringing all to the field of democracy. Such a hyper-political reading of displacing energy makes us essentially tributary to a reply - with vital climate effects - to another question: what economic interests and geopolitical forces allow and enable amplification and more use of renewable energies?

..."Anthropocenia" is only in its beginnings as a discipline with a subject and personal research method. I believe, however, that it should be essentially taken into consideration. Only from now on can I start important clarifications. And it must be heeded not only by research institutes in economics, energy, social, but also the curricula of universities and polling profile, now large and very painful suffering for the economic fundamental disciplines versus subjects such as economic history, culture and general and specialist economics. Unless we do so, changing and correcting the place, we risk to emphasize to the unrecoverable the gaps between realities and others. Having some of the worst consequences...

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<sup>21</sup> Timothy Mitchell, „Carbon Democracy. Le pouvoir politique à l'ère du pétrole”, *La Decouverte PH*, 2013.

<sup>22</sup> T. Mitchell, *loc.cit*