Universitat Rovira i Virgili

Investiture as Honorary Doctor of Mr. Miquel A. Torres

Special academic session,

21 October 2016

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Tarragona

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Commendation of the candidate
by Dr. Joan Miquel Canals Bosch

Most Excellent Rector,
Dear Mr. Miquel Agustí Torres Riera,
Illustrious Academic Authorities,
Friends from the university community,
Colleagues from other places who have come specifically for this event
Ladies and gentlemen,

The event we are celebrating today, beyond the solemnity this special occasion implies, is a great acknowledgement to the personal and professional trajectory of one of the benchmark businessmen for the world of wine-making, Mr. Miquel Agustí Torres Riera, President of Torres Wineries. For the Rovira i Virgili University, he is the first doctor Honoris Causa who does not come from the Academy, although his work fits perfectly with the merits required in theses occasions.

I will now provide a detailed review of the reasons for which — and I speak on behalf of all my colleagues—, the Faculty of Oenology, has encouraged us to nominate Mr. Torres as a candidate to be awarded a doctorate Honoris Causa.

First of all, on the occasion of the celebration of the 25th anniversary of the Rovira i Virgili University this 2016-2017 academic year, from the Faculty of Oenology, we have proposed, as could not have been otherwise, a commemorative (sparkling) wine which you will taste at the end of this investiture ceremony.

Nonetheless, our major contribution to society is to train persons and to provide society with knowledge, and all this becomes richness, that in the case of wine involves our own territory, because, as you can imagine, vines cannot be relocated!! But, behind this ironic image, there is a whole world: thousands of workplaces, hectares of landscape, social structure, sustainability. We can say without a shadow of doubt that oenology is maybe one of the activities in which industry and crafts better combine and the acknowledgement today of the work of the wine sector company which is emblem-

atic in our country, by naming its president as Doctor Honoris Causa, within the framework of this event, confirms even more this fact.

Now, I would like to mention the relation that exists between the company the doctoral candidate is president of and our university. The proof that the training received by the students has the required level consists of the employability of the graduates. For an academic responsible, seeing that in the team of companies like yours (addressed to the candidate), there is a considerable amount of students from our university at positions such as General Management, Technical Direction and any other department that requires a solid knowledge of oenology and viticulture, gives sense to the efforts we make in this regard and justify our existence and specialization. For us, Torres is a reliable and safe partner, which participates in all the programs we propose to them, always open its doors to us and with generosity.

But above all and thirdly, I would like to describe the figure of the candidate we are proposing. Actually, it is going to be a very heavy task, due to the enormous quantity of things he has done in his life.

His main occupation has been the building of a multinational company with a very different approach from the one which was adopted in Spain in the seventies, when trade in wine was governed by the variable of price, as actually the candidate stated in his visionary publication *El vino español, un futuro incierto*. Meanwhile, in Torres, quality, research, innovation and marketing, have always been its banner and certainly have been a determining factor in achieving its current milestones. To convince oneself of this is the company's ADN and I am tempted to say, it is a reflection of the person we are awarding today. This ADN can be summarised in 9 key points that put people first and then, ecology, fair trade, social responsibility, innovation, internationalisation, and marketing, the Torres Family and finally the Primum Familiae Vini.

Mr. Miquel A. Torres studied Oenology in Dijon, before integrating the family business in its fourth generation. Following his incorporation into the company as Technical Manager in 1963, he prompted the division on wines of the company, with the purchase of vineyards and the introduction of new grape varieties which would turn into the wines that we know today and that are also known throughout the world, such as Mas La Plana, Coronas, Gran Coronas, Milmanda, ... Then his activity led him to Chile, where he established a subsidiary company in 1979. The Family business, thanks to his sister Marimar, also expanded into California, in Sonoma County, where

there is an ideal climate for grape varieties such as Chardonnay, Pinot, and also Parellada! When referring to the curious and restless mind of the candidate, in 1982, he took a sabbatical year to study in Montpellier in order to improve his knowledge of viticulture with teachers such as Dr. Boubals or Dr. Champagnol.

In 1991, he was appointed President and Executive Director of the company to continue its business activity of internationalization and growth. As a fruit of his work, he obtained important recognitions that I will point out without attempting to be exhaustive:

In 1996, he was granted the Golden Key to the City of Barcelona in recognition of his professional career. In the same year, he was decorated by the Chilean Government with the Bernardo O'Higgins Medal, in the grade of Grand Officer.

In 1999, Miquel Torres Winery is awarded The Most Important Winery in Spain by the readers of the American magazine Wine Spectator

In 2002, he was named Decanter Man of the Year by the prestigious eponymous magazine specialized in wine. In 2007, he was also chosen by this magazine as The most influential Wine-grower.

In 2012, he received the distinction of the Finland's Lion Order in recognition for his work in promoting cultural and trade relations with the Nordic countries.

He was also distinguished by the Spanish Government with the Gold Plaque for Merit in Agriculture, Fishing and Food Sector.

Mr. Torres is also a person who has been extremely active in favour of the Catalan winemaking sector. He participated in the Villafranca del Penedes Union of Wine Exporters. In 1977, he promoted the creation and presided over the Villafranca del Penedes Wineproducing Union, which was integrated in 2010 into the Catalan Wineproducing Association, from which he was the first President and remained in this position until 2014.

At company level, together with a big wine producer in Burgundy, Robert Drouhin; he founded in 1991 an association of large familyowned companies, *Primum Familiae Vini,* with the philosophy of developing strategies responding to the challenge of familyowned company management, sharing knowledge for the improvement of quality and respect for the environment, as well as diffusing the benefits of moderate consumption of wine

In order to complete this praise of the candidate, I would like to deepen into his concern about the social development of the territory and knowl-

edge. I would like to highlight two books that I consider advanced for their time: *La Viña y los Vinos,* a compendium of oenology and viticulture of 199 pages, and especially his book *El Vino español, un incierto futuro,* in which a textbook example of diagnosis of the Spanish wine industry is made and the basis of what has been afterwards the success of the Spanish wine are given.

The activity of the candidate towards knowledge and technology development has been closely linked to the boost of a multitude of events such as the update that was made of the traditional Wine Fair which used to take place each 10 years in Villafranca del Penedes (1943, 1953, 1963). In 1973, under his influence, technical conferences were fostered and from 1983, he was one of the main driving forces of the FIRAVI fair, a biannual fair in the sector which was held until 1991 with top-level technical events which the candidate here today attended.

The last activities of this type that Mr. Torres has undertaken are the EcosostenibleWine, a biannual symposium of reflection for the wine sector, focused on the protection of the environment, and that this year celebrates its 5th edition. The other milestone in which the candidate is involved is *Las Jornadas Medioambientales*, an Environmental Conference which is held at the University of Barcelona and where are discussed climate change issues and their possible solutions.

Most Excellent Rector, as far as it was possible for me, I exposed the merits of Mr. Miquel A. Torres. I think I have enough insisted and impacted on his worth for him to be awarded, with your authority, the recognition of his merits. Therefore, I ask you to deign to grant the degree of Doctor Honoris Causa to Mr. Miquel A. Torres and to include him this way in the cloister of our university.

Thank you very much.

Award acceptance
speech by Dr. Miquel A. Torres

Viticulture (and its future) in the Anthropocene

Most Excellent Rector, Esteemed Authorities, dear colleagues, ladies and gentlemen, I would like to express my sincerest gratitude to the Most Excellent Rector of the Rovira i Virgili University, Dr. Josep Anton Ferré, to the President of the Social Council, Mr. Joan Pedrerol, the Secretary-General Dr. Esteve Bosch, as well as to the Governing Council, for giving me this immense and undeserved honour to be invested Doctor Honoris Causa. My appreciation also goes to Professor Joan Miquel Canals, for his patience in preparing this text, and to Professor Oriol Amat.

However, in view of the list of the illustrious scientists and responsible authorities before me awarded with an honorary doctorate, it seemed to me that the Rovira i Virgili University was too generous with my person. This distinction is of great importance to me, taking into consideration the importance of this university which precisely this year is celebrating its 25th anniversary and is already ranked among the 400 best universities in the world according to the Shanghai Word Ranking.

As a Company, we have always had an excellent relationship with the University. Many oenologists graduated from the Rovira i Virgili University have come to work in our company, such as my past CEO, Mr. Raul Bobet, who was a lecturer at the Rovira i Virgili University, and, what is most important, my son also studied an Oenology and Viticulture specialization course at that university. Finally, in recent years, we have been able to reach a collaboration agreement between ESCAVI (L'Escola Superior del Vi I el Cava de Vilafranca, the Wine Business School of Villafranca) and the Rovira i Virgili University.

The truth is that it was a big challenge for me to write these lines because I was very impressed by the level of the past doctors Honoris Causa by this university. It would appear that I am the first businessman to have the honour of receiving this award and this made this work even harder for me.

In 2011, the Russian Scientist Vadim Ivánovich Utkin presented his development of mathematic methods for the description of variable structure

systems and the control in slip-free mode. In 2012, Dr. Philip Douglas Jones talked about his contribution to the science of climate change and the study of global warming. According to the *Times* magazine, he was one of the 50 most important scientists in the world and actually won the Nobel Prize. In 2013, Jean-Paul Malrieu presented some pioneer works using the quantic chemistry methodology; as well as, in the same year, Federico Mayor Zaragoza, who needs no introduction anymore, and in 2015, Paul Preston, an acknowledged historian and hispanicist, etc.

Chemistry has always been a science I have been interested in, and this is why, in 1959, when it was time for me to choose the universitary studies I would undertake, I decided to study chemistry at the Central University of Barcelona. And it was a few years later, in my second year at university, that my father offered me the possibility to go to France and study Oenology, since in these years, there were no wine studies at university level in Spain.

I have to say, though, that I was attracted by the idea of leaving the Spain of the 1960s and going to France, to Dijon.

I spent two very interesting years in Burgundy that allowed me to discover my passion for wine and to start dreaming of making great wines as well at home.

Once back home, the first thing I did was to ask my father if we still had some vineyard, since I knew that he had sold the family property we had in Sant Pere Molanta shortly before the war began. But, I also I knew there were still 2 o 3 hectares adjacent to the main property. The trouble was that my father did not remember where these hectares were located and that we couldn't find the deed of the property. Fortunately, our old barrel maker remembered very well the location of these lands, and with a little luck, we were able to recover them.

There, I planted the first collection of French, German and even Italian wine grape varieties with the purpose of studying the possibility of their adaptation to our country. I also remember that some years later, when we had the first harvest nearly ready to be collected, a severe hailstorm struck the vineyard this August and destroyed everything. We had to wait another year to confirm that grape varieties such as Cabernet Sauvignon could be an interesting option in the Penedes region. We also counted on Jean Leon's

expertise, who had already planted Cabernet Sauvignon since the beginning of the decade at his Torrelavit estate.

Soon after, my father agreed to buy the Mas La Plana estate, located some 3 km from Villafranca, and immediately after that, the next winter, we planted our first hectares of Cabernet Sauvignon.

This was an important change for a company which began in the XIXth Century with the business of wine in bulk, and which is now clearly oriented towards the production of high quality wines that have always been closely linked to land.

In the meantime, since the late sixties, we already started to make wine in barrels from Parellada grapes in Pontons, in order that, there, the cold nights in the mountains could help in keeping the most which was boiling under more controlled temperatures; later on, stainless steel tanks at a controlled temperature were used in Pacs. The result was spectacular and the resulting wine, Viña Sol, was recognised as the first fresh and aromatic white wine in Spain.

We also worked on improving the quality of the Cariñena and Ull de Llebre Spanish varieties used in our red wines by ensuring a reduction in the production per hectare and by introducing the use of new oak barrels.

At another level, in the early 1970s, the end of the regime of General Franco became a reality. For all us who were born or had lived during this regime, it was difficult to imagine what would come next. I remember that I consulted Josep Subirats, an economic assessor of the company at that time who had helped a lot my father in the past, what I could read on socialism and its historical evolution, since my knowledge on this subject was practically inexistent. He recommended that I read the complete collection by the English historian, economist and sociologist George Douglas Howard Cole, which I actually found of most interest. Shortly after that, I also dared to read *The Communist Manifesto* by Karl Marx (1848) and his classic work *The Capital*, among others.

I think that these readings and further ones enabled me to understand the importance of counting on committed employees and the need to get their participation and grow their enthusiasm for the future of the company. I also understood that it was important to endeavour to improve, each year, their standard of living.

I also spent some time writing wine books, the first of which, *Viñas y Vinos*, was published in 1977, was translated afterwards into various lan-

guages and can still be found in some bookshops. But, I also wrote *El Vino Español, un incierto futuro*, in which, somehow, the ideas of Karl Marx applied to the world of wine were very much present and which made clear a need for changes in the European institutions in order to compete with wines from the New World.

I wrote other books later as the fruit of collaboration with my very good friend Mauricio Wiesenthal with whom, we even dared to write a magazine on wines…

In 1979, the French magazine *Gault & Millau* held the most important wine tasting of the past time... And, the big surprise was to see that our Mas la Plana was ranked at a better position than the very famous Château Latour!

A few years later, in 1982, I returned to university, this time in Montpellier, to take a sabbatical year. If in Dijon, I learned to know and love wine, in Montpellier, I learned to love viticulture, and as my teacher, F. Champagnol, used to say, "il faut raisonner la viticulture", this year was a great experience for me and a reward to see that by the end of the course, while I was studying for the exams, I was able to feel that I could understand the sensitive biological mechanisms that make the life of vines possible.

These studies enabled me after, once back home, to develop, with the invaluable assistance of our staff, a major winegrowing project in Catalonia which continued to expand until the 1800 hectares of vineyards which we own today, apart from our involvement in also helping to improve the productions of the nearly 900 Catalan winegrowers who are working with us.

These studies also allowed me to confirm the good decision we took to go to Chile in the year 1979. When my father bought the first estate in Curicó, we were then fortunate that a good friend of mine, Alejandro Parot, accompanied me through the country and helped us with the first steps of that project. I remember that in those years, I used to say that Chile's Valle Central was The Viticulture Paradise.

1991 was the year when my father died, after a long illness. My participation in the enterprise's business activities and my frequent travels throughout the world at the time generated in me the illusion for making changes in the company management. I had a drawer where went all those ideas and projects my father did not consider appropriate. I did not have any knowledge of management nor finance, but thanks to Professor Esteva Canals and to various courses at the IMD Business School of the University of Lausanne,

I could manage to attain an acceptable level. We were starting a new stage of international expansion by acquiring holdings in various distribution companies to different countries and by even creating our own company in China, in Sweden, etc. At that time, we also had an extraordinary Advisory Council composed of university lecturers and businessmen (Josep Mª Anzizu, José J. Pintó, Mariano Puig, Ignacio Ferrero, and Javier Cano) who have been extremely helpful over the past years.

During the following decades, until the year 2000, our challenge was clear to us, namely, to elaborate wines at the highest level of quality so that they could compete with the best wines in Spain and the ones from other big wine producer countries in the world. It was indeed a great challenge because we did not have a tradition of making wines of this type. It is true that my father had achieved, with his commercial spirit, his capacity for work and his exceptional friendliness, to position our wines in more than 100 countries worldwide. Well, this big challenge, we have overcome it, with great effort, by working and studying, but also and above all, thanks to the company's directors and to the great human team that was composed of around 1000 persons in those days. (Today we have some 1300 employees worldwide). My wife also made possible over these years my dedication to the company: apart from awakening the interest of the German market, she raised our children with an extraordinary attention. The fact that we have always understood each other and that we have always come to an agreement with my brother and sister, not to mention my son Miguel (CEO), my daughter Mireia (R&D&I, Jean Leon and Torres Priorat Director) as well as my elder daughter, Anna, who is a plastic surgeon, also helped a lot.

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Then came the XXIst Century and the planet's global warming was already being spoken. From time to time, some newspaper or scientific magazines included some mention of it.

Just in case, we began to acquire pieces of land in colder regions in the north of Catalonia, at a height of almost 1,000 meters. As far as we were concerned, at a wine-grower level, it is true that we began to notice a bringing forward of the harvests, but we didn't give more importance to it. The worst thing about it was that the red grape varieties were maturing sooner according to the grape sugar levels and that in contrast, with regard to the

levels of polyphenols, the maturation required waiting. (For that reason, red wines are increasingly having higher alcoholic strengths).

In the year 2007, I watched the film by Al Gore *An inconvenient truth* and it really impressed me a lot. I understood that our future was at risk and that climate change could have serious consequences for viticulture across the globe. We were able to overcome the previous challenges, but this time, we were faced, and we still are, with an enormous challenge.

I started reading books on the subject; the first one: La historia del clima de la tierra (paleoclimatology) by Professor Antón Uriarte, with whom I had various meetings later, and who has always been a great help for me to understand the scale and significance of this issue. So, I kept reading books on climate change, up to 35 books in total so far, and in each of them, I could find interesting ideas. We also got into the habit with Mr. Josep Amadó, our Environment Director, of periodically inviting lecturers and specialists to our company to talk about these issues. Some of them were defenders of climate change, but we also invited sometimes "deniers" in order to also discuss their positions from our point of view.

Most probably, with other political and economic structures in the world, we would not have reached the degree of global warming we have today, but if you don't mind, we will expose and discuss our comments on the question at the end of this presentation.

It is true that over the 4,500 million years of history of our planet Earth, there have been warmer but also colder periods in comparison with the current one. Actually, the variations are not so big: according to James Lovelock, the variation between the average temperature in the pre-industrial age and the last ice ages would only be of 5 degrees; and the variation between the current period and the warmest periods of the planet's history, would also be about 4 or 5 degrees.

Paleoclimatology is a fascinating science, especially if you think that the Earth remains almost the same and the only thing that has changed is time. We are here now but we are an accident. Our own human species, the *Homo sapiens*, will surely be extinguished one day; possibly much earlier that the Sun comes to its end, probably in 4 or 5 million year time. As we know today, these climate changes which have occurred throughout history can be explained with the Milankovitch cycles, which imply the elliptical orbit of the Earth around the Sun, the tilt of the Earth's axis,; but also the sunspots, the shift of continents and the volcanic eruptions, etc. And, we

also know that for 12,000 years now, with the end of the last ice age and the beginning of the Holocene period, we have had a stable climate period which has allowed that extraordinary development of our species.

If we analyse the last 500 million years of our history, from the arrival of the Cambrian, we can conclude that it is from then on that the plant and animal life reached a significant degree of development. We went from single-cell organisms to much more complex eukaryotic organisms. It is when the higher animals and trees, plants and vegetables of a large size, appeared on Earth, thanks to the lignin which is part of the bark of logs.

The current average temperature on the Earth is about 15 º Celsius and during the last 500 million years, there have been several ice ages, but in general, the temperatures were higher than the current ones. 65 million years ago, in the K-T disaster (Cretaceous-Tertiary), possibly a giant meteor hit the Earth and created a rapid cooling due to the effect of aerosols.

Much later, only 20,000 years ago, there was the peak of maximum cold and ice of the last ice age, a moment in the history of the planet.

Thereupon, the major part of what currently are the United States and all the Canada were covered with a thick layer of ice. Europe, for its part, was also covered with ice, nearly until the South of France. In the vicinity of Marseille, there are some caves, which can be visited and where you can see cave paintings from 20,000 years ago showing penguins.

Meanwhile, at the end of the Pleistocene age, more exactly in the Lower Palaeolithic, approximately a million years ago, appeared the first *Homo erectus*. Much later, in the Middle Palaeolithic, appeared the first Neanderthal man (the *Homo neanderthalensis)* and next, the *Homo sapiens*. These two species coincided in the last ice age and suffered its terrible consequences.

In the Earth's last 12,000 year history, known as the Holocene Epoch, the temperatures were more stable, although it was clear that in the XIIIth and XIVth Centuries, took place the so-called Medieval Warm Period. Consequently, throughout this period, vines could be planted in England. Actually, today and for years now, vines are planted again in England. All the area around Island which was surrounded by a thick layer of ice was thawed and it is when the Vikings were able to reach Canada.

This warm period was followed by the Mini Ice Age, between the XVIIth, XVIIIth and middle of XIXth Centuries. It was not an ice age, but temperatures dropped significantly: each winter, the River Thames in London, as well as

the Seine in Paris, was frozen. We have a lot of records about it because by then, viticulture already existed in much of Europe.

We can thus say that in the course of the Earth's history, the temperature variations were due to natural causes, most of them being fully explained nowadays. Also, these changes were, in general, very slow: for instance, the last increase in temperatures in the Palaeocene-Eocene, 55 million years ago, lasted 20,000 years and was only of 6º C. But, in the past few centuries, has taken place the Greenhouse Effect which is entirely unrelated to natural causes. There has been an increase of anthropogenic gas emissions, mostly CO_2, but also nitrous oxide, methane and HFCs have gradually increased, causing by means of this greenhouse effect, a rise in global average temperatures: solar radiation of short wavelength range reaches the Earth and if this radiation does not find any ice or sand (Albedo Effect), it is transformed into long-wave radiation. In the subsequent normal process, this long-wave radiation is then evacuated to the troposphere and this is what has been happening for over thousands of years. But, the fact is that these greenhouse effect gases work by slowing down the ascent of long-wave radiation which falls back again to the surface of the Earth, due to a rebound effect. This is precisely how an agricultural greenhouse works.

As an example, l'*Institut de la Champagne* has produced since the year 1860 a chart which shows a direct parallel between global average temperatures and CO_2 levels in the atmosphere. The CO_2 content of the atmosphere was of only 278 ppm (parts per million) in the XIXth Century. Today, this content has already exceeded 400 ppm and the danger is that this CO_2 content can reach the figure of 500 parts per million or even more this century. If that happened, there would be a great danger that we would come back to eras as old as the Pliocene when temperatures used to be 5 degrees higher.

Deforestation is another cause of the rise in average temperatures. Through photosynthesis, trees have a clear role of balance in order to maintain the levels of carbon on the Earth. The felling of forests not only makes impossible photosynthesis but also implies that when it gets rotting, the timber ferments and produces CO_2 which goes to the atmosphere too. Although deforestation has slowed down a little bit, according to the Food and Agricultural Organization of the United Nations (FAO), another 33,000 km^2 of forest area were lost in 2015. Furthermore, the total number of inhabitants on the planet has considerably grown from 1,000 million in the year 1700 to 7,000 million nowadays.

The current situation is indeed pessimistic. Most of the Arctic ice cap had melted this summer and maritime companies are already planning their future routes. Mining and oil companies are also beginning to study the possibility of exploiting the rich Arctic underground resources. The melting of the Arctic Ice Cap does not lead to a sea level rise, as it is ice which is over the water, but results in an increase in the temperatures in this area of more than 3 ºC, starting from a 1951-1980 basis until the years 2011-2015.

The case of Antarctica is different, as the major part of the ice is located on the rocky surface of the continent. This ice represents 85% of the planet's ice and has always been the Earth's ice reserve for millions of years. The Antarctic ice sheet is some 3 kilometres thick. There is also ice in Greenland, which approximately represents 10% of the total amount, and in the glaciers, although these are reducing between 3-4% of total ice. The melting of the world's glaciers and ice sheet in Antarctica, in turn, is resulting in rising sea levels. The subsequent effects are already well-known but the worst is yet to come, as water levels could rise by 50 cm by the end of the century.

To assess the extent and effects of climate change, was created some years ago the Intergovernmental Panel on Climate Change (IPCC), which is composed of 2,500 climate scientists , the best in the world, and who write up a report for the United Nations, at least each four years. Their later works are truly alarming and confirm that the observed increase in temperatures is anthropogenic, that is to say that we are the only ones responsible for it, as we are causing this new warm period.

Will we be able to reverse this process?

It is true that in our days, some nations and institutions have already made significant progress in reducing greenhouse gas emissions. In Germany, for instance, following a design by Professor Hermann Scheer, the use of renewable photovoltaic energy has been able to significantly expand, and now Germany has a leading position worldwide with 11% of the total produced energy generated by household installations.

Unfortunately, in recent years, subsidies for renewable energy were abolished in Spain and hence very few homes produce their own energy. In addition, the bureaucracy required to authorize these energy facilities in homes is very laborious, and worst of all, the final connection depends on the electric companies themselves.

Nevertheless, Spain is one of the major producers of wind energy which represents almost 20% of all the electricity produced in the country.

There are also alternative energy sources such as geothermal energy, but it is virtually non-existent in Spain due to the lack of political will to promote the use of renewable energy, in general.

In any event, the major difficulty in tackling the issue of climate change is the existing economic structures. We have moved on from a form of social capitalism which mostly took place after the Second World War, in 1959, when in Bad Godesberg, the German Social Democrat Party gave up the ideology of Marxism, enabling the development of the consumer society in Western countries, to a very different form of capitalism. Firstly, in the seventies, when the gold standard was abandoned and later on, in the eighties, with the coming to power of Ronald Reagan in the United States and Margaret Thatcher in England, Capitalism underwent a major turnaround. A process was then initiated in order to powerfully stimulate the structures and banks were allowed to issue their own monetary products, etc. And, the most important thing is that a culture of the importance of profit above all was developed and had spread including into many universities and business schools. Since then, the decisions made by companies are usually profit-driven, and especially short-term profit-driven in the case of companies listed on the stock exchange. This new capitalism has also brought us to the loss of the workers' rights in many countries. In Catalonia for instance, in 2016, 13% of workers are living in poverty.

But these new economic structures have also had a strong impact in politics, and it is well known today that economic lobbies are of great relevance and can considerably influence the decisions made by governments. Seen in this light, it is not difficult to appreciate, for instance, the difficulties faced by renewable energies in many countries. These lobbies also extend, as we all well know, in the case of the United States, among others, to the defence of weapons, carbon mining and oil industry which, in the latter case, can even achieve nowadays subventions in the order of 500 billion dollars a year worldwide, while renewable energies scarcely obtain between 5 and 10% of this amount. This means that 13% of CO_2 emissions in the world are subsidized.

Precisely for that reason, it is so difficult to get laws and political convictions in order to combat climate change and avoid disastrous consequences for the Earth.

By means of minimal tax compliance, the existence of tax heavens, a wage gap between Senior Management and unskilled workers, etc., and a

model of economic development based on the predominance of the financial sector rather than productive areas, this new capitalism can also lead to paradoxical situations in which workers' funds of pension schemes are invested in businesses that only aim to obtain the maximum profitability rather than privileging any ecological standpoint or simply, the rights of workers and people in general.

Just a few months ago, the newspaper *La Vanguardia* published an article which explained how the shareholders of the oil company ExxonMobil refused in their large majority to implement any change in the company policies with regard to promoting actions to mitigate the impact of climate change.

Will it be possible to restore balance on our planet?

It is true that, as says James Lovelock in his Gaia theory, the planet Earth has always made it possible to sustain life on earth. In fact, Gaia is still doing a great job, as half of the CO_2 we emit remains retained on the Earth, or in the sea, or in the vegetation. In the case of vegetation, this is possible thanks to the process of photosynthesis. As far as the sea is concerned, there are various determinant factors, such as the phytoplankton and the algae, which also carry out photosynthesis. There is also the zooplankton, tiny animal organisms named foraminifera which are like microscopic snails and which collect rainwater containing dissolved CO_2 in their shells to produce carbonates. On dying, these animals fall to the bottom of the sea and produce millions of Giga Tonnes of sediments. The ocean is also doing a great job by absorbing heat and CO_2, although this results in the acidification of the oceans that can potentially affect both the phytoplankton and the zooplankton. It is estimated that, by 2050, there could be a potential change in trend in the behaviour of the oceans and, as a consequence, a significant rise in the greenhouse effect and in temperatures.

It is true that in a private capacity, efforts can be made and should be made to fight against climate change. For example, in our company, we have invested about 10 million euros over the past 8 years, especially in renewable energies, in biomass and in research. Today, in our main cellar in Pacs, we are already producing 25% of our electricity needs by means of photovoltaic panels and biomass; we have planted 35 hectares of forests. We have a fleet of 5o hybrid and electric vehicles and we are investigating very interesting subjects such as the use of algae to capture the CO_2 generated from the fermentation process or the accelerated formation of

carbonates from CO_2. We reduce each year our carbon foot print per bottle, internally, but also with respect to our grape or glass packaging suppliers, etc. Fortunately, many other companies are also investing in renewable energies.

However, there is no conviction on a general level of the urgency of changing our lifestyles. Do you remember any Spanish politician talking about climate change in the last elections? Therefore, while the economic structures and the current capitalism model have a strong influence on politics, shifting to renewable energy and to a society less dependent on fossil fuels will be very difficult.

Beyond the pollution generated from air transport or industrial activities, etc., there are nowadays more than 1,000 million of vehicles circulating around the world.... When will it be possible to replace them for electrical cars that pollute much less?

In addition, Jeremy Rifkin, in *The Third Industrial Revolution*, denounces how the indirect costs of production are transferred to society and claims that any fuel should include the costs of air and water pollution.

Joseph Stiglitz, winner of the Nobel Prize for Economy, wrote some time ago that the owners of the energy companies endanger our planet by looking to substantially improve their profits.

Stephan Faris, three years ago, made it clear in the *Forecast* magazine that the most serious consequences of climate change are already being seen now with emigration, the emergence of new diseases, and the disappearance of glaciers.

Even more drastic are the conclusions by Lester R. Brown in *World on the Edge:* How to Prevent Environmental and Economic Collapse and I will only quote one of his sentence, as an illustration: "Threats to our future now are not armed aggression but rather climate change, population growth, water shortages, poverty, rising food prices…But fuel and armament industries want to maintain the status quo."

Jeffrey D. Sacks wrote in 2010 that we are on a dangerous slide towards disaster and if we do not find a global leadership right now, we will learn from that lesson in the hardest ways possible.

Actually, what gave me even greater cause for concern are the recent statements by James Green, who is the Director of Planetary Exploration at NASA and said as follows: "Climate changes and can destroy life. If we do not learn to emigrate to other planets, our species might be extinguished".

But, there is also some hope with the agreement signed in Paris last year, as it is a major step forward towards this global convention on emission reduction. It was not too long ago also when the United States, Mexico and Canada have agreed to reduce their CO_2 emissions by 50% by 2030 and a few weeks ago, China and the United States have ratified the Paris Agreement.

Not so long ago, the International Energy Agency also mentioned that we are living in a cascade of advertisements from companies and investment funds that dissociate themselves from investments related to fossil-based sources of energy. And, by contrast, the so-called *green bonds* are on the increase.

Possibly, if the oil companies invested as well in renewable energies and especially in investigation by drawing on the huge financial resources they have, this trend could vary.

A few months ago, Mark Jacobson, the Director of the Atmosphere and Energy Programme of Stanford University, in an interview with the newspaper *El Mundo*, said as follows: "The Global Energetic Transformation can be achieved by the year 2050, without the need of using fossil or nuclear sources and even without increasing the number of hydroelectric power plants".

Up to 182,000 jobs would be created in Spain in the building and operation of clean energy facilities and thousands of the premature deaths we have each year due to illnesses arising from polluted air would be avoided.

Many years ago, the Stern Report already recommended investing in R&D to prevent our planet from a catastrophic global warming. New technologies could possibly stop the emission of greenhouse effect gases, such as the capture and storage of CO_2 (Carbon Capture and Storage, CCS), the accelerated formation of calcium and magnesium carbonates produced from the CO_2 generated in thermic power plants and others, algae of the type cyanobacteria, chlorophyte (green algae) and diatom (among others), the intensive planting of forests, etc. Actually, many solutions could certainly come from the chemical industry and universities, such as the Rovira i Virgili University, which are highly targeted towards studies of this type. Finally, in the future, the development of fusion energy could be the definitive solution to these problems.

We cannot forget either the positive side of all this and with which I would like to end this presentation: in other words, the importance of the implementation of taxes on fossil fuels in the form of environmental bur-

dens, just like the ones that presently exist in Denmark and in Holland, as already suggested by Thomas L. Friedman a long time ago.

The *Homo sapiens*, throughout the last millennia, has proven that he can deal with the worst of circumstances in order to save the species. And if capitalism has been able to change its course in the XIXth Century, I am sure that it will also have to listen to all these voices that are being raised in order to achieve this turnaround which will bring us back to a social capitalism that will take into account the economically most disadvantaged segments of society, the Third World, immigrants, and above all, a capitalism that will focus on a world based on renewable energies and a residual consumption of fossil-based sources of energy. These are the recommendations by authors like Thomas Piketty (*Capital in the XXIth Century*), Christian Felber (*La Economia del bien común*) or Naomi Klein (*This Changes Everything: Capitalism vs. the Climate - Esto lo cambia todo. El capitalismo contra el clima*).

I should not like, as recommended James Green from NASA, to have to prepare for living on Mars. I should not like to believe either that my successors will have to plant vines there and abandon this beautiful planet we live on and which I am sure we are still in time to save.

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