

Law, technology, and the butterfly effect

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Artigo submetido em: 25/04/2016

Aprovado para publicação em: 25/04/2016

Abstract: Exploring the insight of the butterfly effect from chaos theory, this article shows how technological transformation influences legal change. The argument is developed from a sociological and a historical perspective, comparing and contrasting social customs since the seventeenth century until today and showing the transformation of criminal offenses. In societies with a strict moral code, adultery, fornication, and sodomy were sexual crimes, even if victimless. After the sexual revolution, these conducts are no longer criminal. Explaining this phenomenon, the article identifies the change of attitude towards human nudity as an important factor and considers this change of legal culture to be a consequence of technological innovations related to personal hygiene, public health, and cleanliness. The taboo against nudity persisted because bathing was not considered healthy and there were no separate bathrooms in residences until the end of the nineteenth century. Examining nudism, the possibility of divorce and human rights protection, the article emphasizes the role of technology for the cultural revolution, and of culture for legal change. Another interesting example of the relationship between law and technology comes from the development of the automobile industry and the emergence of a series of laws to regulate exhaustively individual transportation. Moreover, the invention of antibiotics altered the expectation of the sick individuals who expect to be cured and, as a consequence, affected also the practice of torts and civil liability. The flap of wings of various butterflies led to the current setting.

Keywords: Law and technology; Legal Change; Legal Culture.

Lei, tecnologia e o efeito borboleta

Resumo: Tendo como ponto de partida o efeito borboleta desenvolvido através da teoria do caos, este artigo evidencia como a transformação tecnológica influencia a mudança do direito. O argumento é desenvolvido a partir de uma perspectiva sociológica e histórica, comparando e contrastando os costumes sociais desde o século XVII até os dias de hoje e como os tipos criminais foram sendo transformados. Em sociedades com código moral rígido, adultério, fornicação e sodomia eram crimes sexuais, ainda que não houvesse uma vítima. Após a revolução sexual, tais condutas não são criminosas. Explicando tal fenômeno, o artigo identifica a mudança de atitude com relação à nudez humana como fator importante e atribui essa mudança na cultura jurídica como sendo uma consequência de inovações tecnológicas relacionadas a higiene pessoal, saúde pública e limpeza. O

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tabu da nudez persistiu porque tomar banho não era considerado saudável e inexistiam banheiros separados nas residências até meados do século XIX. Examinado o nudismo, a possibilidade de divórcio e a defesa dos direitos humanos, o artigo enfatiza o papel da tecnologia na revolução cultural e da cultura para a mudança jurídica. Outro exemplo interessante da relação entre tecnologia e direito provem do desenvolvimento da indústria automobilística e do surgimento de uma série de leis para regular exaustivamente o transporte individual. Além disso, o advento dos antibióticos alterou a expectativa de doentes que esperam ser curados e, por consequência, afetou também a prática da responsabilidade civil. O bater de asas de diversas borboletas conduziram ao cenário atual.

Palavras-chave: Cultura Jurídica; Direito e Tecnologia; Mudança Legislativa.

Edward Norton Lorenz, a mathematician, is well-known for his contributions to chaos theory; for us lay people, who have not the slightest idea what chaos theory might be, he is best known for his description of the so-called “butterfly effect.” This is the possibility that “the flap of a butterfly’s wing in California ends up triggering a hurricane in the mid-Atlantic.”(JOHNSON, 2014, p. 5). The point is that some small event sets off a chain reaction, a ripple effect, that ends up with very large consequences.

This particular quote about the butterfly’s wing, comes from a book by Steven Johnson, *How We Got to Now*; Johnson’s book is about the way in which a number of basic advances in technology, in the end, like the butterfly’s wing, led to chain reactions that shaped the world we live in.

I want to begin by focusing on one of these flaps of a butterfly’s wings. In one chapter in Johnson’s book (“Clean” is the title of the chapter), he discusses the rise of modern habits of cleanliness, public health, and personal hygiene. He mentions a crucial step: chlorinizing water. Not until the 19th century did people come to understand the true causes of such diseases as cholera; they had no notion of “germs,” of bacteria, of microscopic organisms that were the source of these illnesses; or the role of polluted water in epidemics. A man named John Leal dumped chlorine into a reservoir in New Jersey. Johnson says, at one point, that “exposing the thighs of female bathers was not in the forefront of John Leal’s mind” when he did this, but “like the hummingbird’s wings, a change in one field triggers a seemingly unrelated change at a different order of existence: a trillion bacteria die at the hands of calcium

hypochlorite, and somehow, twenty years later, basic attitudes toward exposing the female body are reinvented.”²

This rang a bell in my mind. I teach a course on the history of law in the United States. Legal history, to me, is not about the growth and develop of legal doctrine, but about the relationship of law and society, over time. One topic that I cover is the evolution of criminal justice; a sub-topic is the treatment of what we call victimless crime. Sex between consenting adults is a classic example of a victimless crime.

During the colonial period, in, say, the 17th century, in small New England towns, Protestant clergy were dominant figures in the community; a strict moral code was the source of a strict legal code. Adultery, fornication, and sodomy were crimes. The records are full of instances in which these crimes were punished, particularly fornication, that is, sex between unmarried people. Punishments were not particularly severe: whipping, a fine, a forced marriage, perhaps some kind of shaming punishment, like standing in the stocks. Sin and crime were, to a large degree, equated. What was forbidden by God, would also be forbidden by man.³

The first two thirds of the 19th century was less obsessed with sin. A dominant feature of criminal justice was what I have called the Victorian compromise. Criminal law focused more on property crimes and crimes of violence, rather than crimes against morality, including the cluster of victimless crimes that dealt with sex. Many American states recast their laws against adultery, for example. Simple adultery was no longer a crime. The crime was now “open and notorious” adultery.⁴ A person who committed an occasional act of adultery had not violated the penal code. The crime consisted of flaunting immoral behavior, so that it became a public scandal. Official moral standards had not changed very much, but the emphasis had shifted.

In the late 19th century, and into the 20th century, there was a resurgence of interest in the punishment of victimless crime. This movement –we can call it a movement– lasted from about 1870, to the early decades of the 20th century. The crown jewel of this movement, in the

² JOHNSON, p. 150.

³ On this see Lawrence M. Friedman, **Crime and Punishment in American History**. 1993, p. 36-41.

⁴ For example, Cal. Penal Code, 1872, sec. 266a; Rev. Stats. Indiana 1877, v. 2, p. 466, directed at “Every person who shall live in open and notorious adultery or fornication.”

United States, was national Prohibition, in the decade of the 1920's. An amendment to the Constitution had been adopted, in the vain attempt to stop the sale and use of liquor. But there was also heightened control over sexual behavior; as early as the 1870's, Congress passed a law making it a crime to send obscene material through the mails— including information about contraception and abortion.⁵ This period also criminalized abortion altogether; this had not been the case before. Early in the 20th century, Congress passed the Mann Act, the so-called White Slave law. This made it a crime to transport a woman across state lines for prostitution, or “other immoral purposes.”⁶ There was also a strong movement in many cities, like Chicago, New Orleans, and San Francisco, to get rid of red light districts, the vice districts of the cities. These districts had never been legal, just as prostitution had never been legal in the United States. But in the big cities, vice, brothels, gambling dens were largely tolerated. This was, in part, because of payoffs and municipal corruption. This was not, however, the whole story; vice was accepted as a necessary evil— only it had to stay in its place. In some cities, informal rules regulated vice and vice districts: rules about how brothels had to be run, rules which, strictly speaking, had no legal status. But this cozy system came to an end in the early 20th century. The goal of the so-called “red light abatement” movement was to rid the system of vice and prostitution, once and for all. Harsh laws were passed, aimed at the red light districts. Local citizen's groups joined in the enforcement crusade.⁷

We can ask: what brought this movement about? What led to this spasm of reaction against the Victorian compromise? This is, as one might expect, a difficult question to answer; social movements of this type and magnitude often have complex roots. It has been suggested, plausibly, that one factor was a kind of culture war. American society was rapidly changing in this period. Millions of immigrants were streaming into the country, as they were streaming as well into Canada, Argentina, and Australia. These immigrants came from southern and eastern Europe. They were Catholics, Jews, Eastern Orthodox. They came from Italy, from Greece, from the Russian empire. They settled in the big cities, like New York and Chicago. They threatened the dominant culture, and the political rule of the old-line Protestant majority, the

⁵ This was the so-called Comstock law, 17 U.S. Stats. 498 (act of March 3, 1878).

⁶ 36 U.S. Stats. 263 (act of March 26, 1910).

⁷ See Lawrence M. Friedman, **Guarding life's dark secrets**: legal and social controls over reputation, Propriety, and Privacy. 2007, p. 186-188.

English, Scots, and Germans. One result was the passage of stringent new immigration laws. The fight against victimless crime was another result. The war on liquor, for example, was a Protestant war. No Italian ever saw anything wrong with a glass of wine or beer.

What is striking, however, is not only how powerful this movement was –the attack on vice and victimless crime– but also how utterly it failed in the end. Of course, the failure was certainly not obvious at the time; nor was it sudden. Prohibition, to be sure, was extremely unpopular among millions of people, especially in the big cities; and not only among immigrants. It was widely evaded; liquor was sold in secret drinking-places (“speakeasies”); people made it at home; millions of gallons came in through Canada. After little more than a decade, the Prohibition amendment was itself amended out of existence. The developments in the last third of the 20th century were even more striking. The anti-vice movement went into reverse. The states revamped their penal codes: adultery and fornication were no longer crimes, by 2100; in a few states, these laws stayed on the books, but were almost never enforced. “Cohabitation,” unmarried couples living together without bothering to get married, is always the norm. Most states, too, decriminalized same-sex relations; and a Supreme Court decision, in 2003, struck down the dozen or so that were still on the statute-books.⁸ A movement to allow gay marriage suddenly gained force. In a surprisingly short time, there has been an amazing reversal of public opinion; and in June, 2015, a Supreme Court decision made gay marriage legal for the whole country.⁹ Most states already had reached that point. Today, in the United States, whatever consenting adults want to do to and with each other, is perfectly legal. You can get into trouble only if you use force; or if you prey on those who are below the age of majority.

This is part of the so-called sexual revolution; sexual permissiveness is, indeed, one of the salient features of society, in most developed countries. Each country, of course, has its own unique story; but the trends are the same, in the Americas, and in Europe. In many ways, this is a development that would have surprised our great-grandparents. If you asked an intelligent European, say, in 1900, to predict what the 20th century would bring, the sexual revolution would be just about the last thing they would have expected. Indeed, on the

⁸ *Lawrence v. Texas*, 539 U.S. 558 (2003).

⁹ *Obergefell v. Hodges*, 136 S. Ct. 1039 (2015); the decision was announced on June 26, 2015.

contrary, many respectable, middle-class people would probably have predicted the reverse. Civilization was on the march, and civilization meant that vice, perversion, and prostitution would eventually melt away, or at least be reduced and contained. They would have been astonished to know that almost everything once labeled as vice, perversion, and debauchery would become perfectly legal; would be accepted as normal aspects of society.

The sexual revolution is a fact of life. And a fact of law. This is true throughout the developed world; in Europe, North America, and, to a startling degree, in Latin America as well. The very idea of gay marriage was once unthinkable. It is still strongly resisted in Eastern Europe, and even more so in parts of the less-developed world. But this unthinkable idea is now the law of the land in the United States. It is also the law of the land in Spain, Sweden, and the Netherlands, among other European countries. The first Latin American country to recognize such marriages was Uruguay; but same-sex couples may now marry in Argentina, Brazil, and parts of Mexico. Other countries –Germany, for example– which do not yet recognize same-sex marriages, have provisions for “civil unions,” which are marriages in almost everything but name.

In some ways, even more surprising is the breakdown on taboos against sex outside of marriage. Cohabitation –unmarried people living together– is almost a way of life in the Western democracies. At one time, most religions strongly condemned couples who were “living in sin.” Sex outside of marriage was also quite generally a crime. By the end of the 20th century, in many parts of the developed world, this concept was almost as out-of-date as belief in a flat world. In a famous case, *Marvin v. Marvin*, decided in 1976,¹⁰ the Supreme Court of California first confronted the issue. The plaintiff, a woman, sued a movie actor, Lee Marvin, who had (she said) promised to share his earning with her if she came to live with him. His defense: such a contract is inherently immoral, and cannot be enforced. But the California Supreme Court disagreed. Society (said the court) no longer condemned this behavior; the mores had changed. They sent the case back to the trial court, telling it to take the plaintiff’s claim seriously.

¹⁰ *Marvin v. Marvin*, 18 Cal. 3d 660, 557 P. 2d 106 (1976).

That was one generation ago; but it seems almost quaintly old-fashioned. By the 1990's, the honeymoon had become something of an anti-climax; more than half the couples who got married in the United States had already been living together. Moreover, illegitimacy no longer carried much of a stigma. An illegitimate child was once called "filius nullius," that is, nobody's child, or in other words, a person without legal rights as against his parents. That attitude has almost completely vanished. Many cohabiting parents produce children; and still never bother to get married. In Sweden, for example, over 54% of the children born in 2013 were born to women who were unmarried. In the EU in general, 40% of the births are of this type. In Latin America, the percentage can be even higher: 58% in Argentina, and 66% in Brazil, for example.

There are, of course, counter-trends and backlash; many churches remain adamantly opposed to all of these developments. The Catholic Church condemns divorce, cohabitation, same-sex behavior, contraception, and abortion. But most people, even in staunch Catholic countries ignore these teachings. The Irish have accepted gay marriage, by referendum. Poland, another very Catholic country, has an extremely low birth rate. Either Polish couples have given up sex; or are using birth control. I leave it to you to decide which explanation is more plausible. Traditional morality, of course, is far from dead –even in Europe; and, very notably, in parts of Africa, in the Arab world; and in such Muslim countries as Indonesia and Malaysia. Harsh laws against same-sex behavior in Africa have figured prominently in the news; adultery remains a serious crime in Saudi Arabia; and honor killings of girls and women who do not conform to strict standards is a problem in Arab countries, and, indeed, even in some circles in Brazil.

The sexual revolution produced a legal revolution; that much is clear. But where did the sexual revolution come from? I used to tell my class in socio-legal history that it came from the invention of the stall shower. This was meant as something of a joke, but as a serious joke, a joke with a point to it. The stall shower was my example of the butterfly wing. Johnson's example –his butterfly wing– which I quoted earlier, was chlorine in the water supply; and perhaps he has the better argument. What both of these examples have in common is a hypothesis about at least one of the factors that set off the sexual revolution: a changing attitude toward the human body– and especially toward the naked human body. The

idea is this: chlorination, and the invention of modern sanitation, including the stall shower, modern toilets, and even the greater use of the bath tub, played an important role in bringing the naked body out of the closet, so to speak. And this was at least one of the pillars on which the sexual revolution rested.

Attitudes toward the naked body have been, of course, quite variable historically. Everyone has a body; but, as one author has pointed out, there is a crucial distinction between the physical body and the symbolic body. The physical body is pretty much of a constant. We can gain weight and lose weight; we can have face lifts; there are scars and moles and tattoos; but the basic form and shape of the body never changes. The body cannot go “beyond its basic construction.” The “symbolic body,” on the other hand, “shifts, changes and mutates in meaning; it “reflects social and cultural attitudes or in some cases drives them.”¹¹

The ancient Greeks saw nothing wrong with nudity, at least for men; and clothing is certainly optional or lacking in some small tropical societies. In Europe, until the 16th century, bathhouses were a prominent feature of society; but these were later abolished, perhaps because of “puritanical religious reformers,” who saw bathhouses as “hotbeds of sexual uncleanness and political dissent.”¹² Christianity, Islam, and Orthodox Judaism came to take a stern view of nudity. These religions promulgated elaborate rules about sex in general; religious texts and ideas were, if not the source, at least the excuse for these harsh rules. Nudity was certainly under the ban. Women in particular had to cover themselves up, in the interests of modesty. To this day, in conservative Muslim countries, women wear headscarves, to hide their hair; in public, loose robes cover the whole body. In the most extreme versions, everything is hidden, except for eye-slits. Christianity and Orthodox Judaism also insist on modest in dress, for women.

For men, the situation has always been a bit more complicated; the taboo against nudity less strong. A famous American painting, *The Water Hole*, by the artist Thomas Eakins, painted in 1884-1885, shows six men, at a lake, swimming naked. Dress codes for men are much looser than those for women, even in conservative Muslim countries, although nudity is of course banned in public. On the streets, it is common to see married couples

¹¹ ROSS, Chad. *Naked Germany: Health, Race and the Nation*. 2005, p. 6.

¹² SMITH, Virginia. *Clean: A History of Personal Hygiene and Purity*. 2007, p. 179-180.

walking; the wife is covered up from head to toe, while the man wears a T-shirt, sleeveless, blue jeans, and flip-flops on his feet. The naked body, male and female, has also been common in art –at least in modern times, though certainly not in the middle ages. Renoir’s nudes, or Eakins’ men, were somewhat daring in their day. Attitudes, however, were already in the process of change in the late 19th century. Indeed, the purity movement, the crackdown on vice of the late 19th century, can be seen, in a way, as a kind of backlash, a reaction against social mores which were changing rapidly, as a way of plugging the dam and holding back the flood.

Whatever the source of sexual taboos, and in particular the taboo against nudity, they were buttressed by a simple social fact: people were not in the habit of taking off their clothes. In the 18th and 19th centuries, people rarely bathed. Indeed, bathing was considered dangerous to health –quite the opposite of what it is now. And, except for the very wealthy, people had no access to bathing facilities; they lived in crowded cities, or rural shanties. The separate bathroom is an innovation of the late 19th century. People did wash their hands and faces, they sponged themselves off when they could, but what we today would consider a bath, in which you take off all your clothes, and wash the whole body at one time, was impossible for the vast majority of people.

To be sure, in the 19th century, some people thought cold baths were just the thing to train the “character of young gentlemen;” cold baths in the morning “became part of the regime” in many of the elite private schools of England– though of course this was only for children of the upper class.¹³ Warm baths, in any event, were suitable only for women and babies. And hot baths, for a long time, were still thought to be positively dangerous. What brought about a change in attitude was the public health movement; it “raised awareness of the connection between disease and dirt.”¹⁴ Once this happened, people thought differently, and more positively, about bathing, cleanliness, and personal hygiene.

If you look at photographs of bathing beaches in the 19th century, both men and women seem to be remarkably covered up, in two-piece bathing suits. Modesty required as much. For the last century or so, the bathing suit has been steadily shrinking; it is now reduced almost to the absolute minimum –almost, but not quite, to nudity. Bathing and showering, after all,

¹³ EVELEIGH, David J. **Bogs, Baths and Basins**: The Story of Domestic Sanitation. 2002, p. 64-65.

¹⁴ *Ibid*, p. 65.

make nudity normal –an everyday affair. Mostly, these are private affairs; but communal showers, for boys and girls alike, also become more normal, in high schools and colleges.

But what about the sexual aspects of nudity? The nudist movement, which we will mention in a bit, always insisted that nudity was not sexual at all; that the nudist was chaste and pure; that nudity was no invitation to wild sexuality. Nudist colonies were for bourgeois families, acting in bourgeois ways. And, in truth, sexual intercourse does not require people to be naked. You do need a certain amount of exposure –there is no need to draw a picture– but really not that much. When Alfred Kinsey issued his report, in the early 1950's, on the sexual behavior of American women, he reported that a third of the older women, those born before 1900, claimed they had sex with most of their clothes still on. This was considered simple decency; a mark of respect.¹⁵ By Kinsey's time, this kind of modesty had become unusual. But before bathing became normal and common, I suspect that sex without nudity was the general rule, certainly for the poor and the lower middle class. And, of course, in crowded urban slums, or rural huts, there was so little privacy, that couples would feel constrained to have sex as much as possible, without getting undressed.

It is interesting to note the facts of infanticide cases, in 19th century London. In these cases, young women were accused of killing their own newborn baby. All of the women were domestic servants; all of the babies were illegitimate. Surprisingly, most of the women seemed to be able to hide the fact that they were pregnant, and even the fact that they gave birth. And this despite the fact that many of them must have shared their dingy room with other servants. Some contemporary sources mention clothing as one explanation: women wore clothes that made it easy to hide a pregnancy. But what is more important is the fact that these women, quite obviously, rarely or ever took off their clothes.¹⁶

Attitudes toward nudity, as we said, were changing in the late 19th century, under the influences mentioned. At this point, a nudist movement arose, which was particularly strong in Germany.¹⁷ The movement put out magazines, brochures, and books, in praise of the virtues of

¹⁵ KINSEY, Alfred C.; et al., **Sexual Behavior in the Human Female**. 1953, p. 168. The percentage dropped dramatically during the 20th century.

¹⁶ This information is from an unpublished manuscript, Lawrence M. Friedman, "The Misbegotten: Infanticide in Victorian England."

¹⁷ On the rise of this movement, see Chad Ross, Naked Germany: Health, Race and the Nation (2005).

doing without clothing. Nudism was a mark of freedom; it led to wholesomeness, and good health. Nudists organized in groups, and clubs, to devote themselves to the goal of going naked in public. When the Nazis came to power, in 1933, they tried to stamp out this “cultural aberration.”¹⁸ By then, nudism had spread beyond German borders. It had reached the United States by the 1920’s. An early nudist camp was called Fraternity Elysia; and among its members was Charles Richter, who devised the Richter scale for measuring earthquakes.¹⁹ At Elysia, too, nudism was spoken of as a “wellspring or fountainhead of moral and health benefits.”²⁰

Sigmund Freud had a great influence on (intellectual) attitudes toward sexuality, which he helped bring out of the closet. But in Civilization and its Discontents, Freud argued that civilization depended on a certain amount of sexual repression.²¹ Control of animal instincts was a positive value, unless of course it went too far. Nudists, too, were (as we said) anxious to separate sexuality from nakedness. Nudity did not lead to lust; but quite the opposite. Needless to say, the late 20th century turned upside down the idea that repression of sexual instincts was normal. Now people became convinced of the very opposite: sexual repression is bad for body and soul. This idea is, in part at least, an important pillar of the sexual revolution; it underlies the acceptance of cohabitation, of premarital sex, of same-sex relations— and, of course, the laws that permit consenting adults to do whatever they please.

Medical, political, religious, and popular literature in the 19th century preached moderation, and self-control, to a degree that people today would find quite astounding. The literature, for example, insisted that masturbation was not only a horrendous vice, but it was fraught with dangers; it could lead to all sorts of physical diseases, and even to insanity. Books about sex also insisted that too much sex was harmful; and told people not to have sex very often. One author even went so far as to suggest that married couples should avoid

¹⁸ WEINBERG, Martin S. **Sexual Modesty and the Nudist Camp**: *Social Problems*, 12:311, 318. 1965.

¹⁹ HOUGH, Susan Elizabeth. **Richter’s Scale**: *Measure of an Earthquake, Measure of a Man*. 2007, p. 163.

²⁰ *Ibid.*, at 165.

²¹ Sigmund Freud’s Civilization and its Discontents was first published in 1930.

sleeping in the same bed. Otherwise, they might be tempted to have too much of a good thing, with dangerous consequences.²²

No doubt millions of people ignored these warnings, though we know less than we would like to know about actual behavior in the 19th century. Most likely these Victorian prescriptions left behind them a residue of guilt. Victorian attitudes sustained and reinforced a legal regime, under which sexual behavior of any kind for anybody but actual married people, was downright criminal. When these attitudes disappeared, so did the legal regime that reinforced them and turned them into formal rules.

The sexual revolution is a complex phenomenon. Whole armies of butterflies, perhaps, had to flap their wings, to create this particular revolution. Many people feel that the birth control pill, and other forms of contraception, deserve the credit; and these were certainly important; they lessened the dangers of unwanted pregnancies, and made sex less risky. The pill, of course, like chlorination, was part of another, greater revolution, the revolution in science and technology. But the sexual revolution, despite its dependence on the scientific revolution is above all, and whatever its causes, a cultural revolution –a revolution in the way people think and feel; and then also the way they behave as a consequence. It is a reflex, also, of expressive individualism: the characteristic modern form of individualism. This is the notion that each person has the right, and should have the opportunity, to make of the self all that it can be, or all that it wants to be; the right to craft a unique personality.²³ What brought this about is a complex and tangled question; clearly, however, the sexual revolution depends on it.

Marriage, too, has become an expressive act. People marry for love. They also can and do divorce when love turns to ashes. Arranged marriages are gone from developed countries. Divorce, once rare or, in some countries, non-existent, is now part of the legal framework in almost every developed country. Each country, of course, has a unique history of response to the demand for free marriage and free divorce. Some reacted more slowly than others. Italy allowed divorce only in 1970, Brazil in 1977, Ireland in 1995. Some countries held out against

²² The author in question was Dr. Frank Lydston, in *Sex Hygiene for the Male and What do Say to the Boy* (1912), p. 133: “Too intimate association is a direct cause of sexual excesses.”

²³ On the concept of expressive individualism, see BELLAH, Robert; et al. **Habits of the heart: Individualism and Commitment in American Life.** 1985, p. 334-336.

divorce even longer. Chile's divorce law is from 2004; Malta's from 2011; and it is apparently still unavailable in the Philippines. In many countries, including the United States, divorce, which was once expensive and hard to get, is now much cheaper and easier.

Another cultural revolution is what we might call the human rights revolution. This is another, and critically important, trait of modern society; and hence of modern law. The human rights revolution is also a legal revolution. It takes the form of constitutions, bills of rights, national and international charters and treaties, and, very definitely, courts with the power of judicial review. Human rights law depends on the human rights culture.²⁴ This, in its most basic form, is part of the general culture: not the product of political philosophy, but a genuinely popular sense that everyone has, or should have, certain basic rights and freedoms. That this is a distinctly modern idea seems obvious: nobody, for example, in the middle ages really believed in democracy, or the equality of the sexes, or indeed of freedom of religion and of speech. The human rights revolution, and the sexual revolution are, I think, closely connected. Both of them rest on expressive individualism. They both depend on certain premises: the right to choose a religion, a path through life, and, yes, a sexual partner, free from government interference, and the interference of private institutions.

In medieval times, people tended to believe that society, like nature, was fixed, static, unchanging, at least in essential aspects. Most people were poor, scratching a living from the soil, and paying tribute to those at the top of the pyramid of authority. The social structure, from top to bottom, was ordained by God. Kings ruled by divine right. The kings today are gone or powerless, in developed countries. Nobody believes that the social structure is fixed, and permanent; that classes and strata of society can never change. More than anything else, it has been technology which, in the end, destroyed the idea of a static social order, a society in which most people were poor and would always be poor; in which the status of your birth was also the status of your journey through life, up to the moment of death.

People today do not like to use the word "progress." It seems naïve. Sometimes, when we look around at the world, it is hard to argue that things are getting better. Yet deep down, people do believe in progress. They certainly believe in change. Change is a constant in our

²⁴ See Lawrence M. Friedman, *The human rights culture: a study in history and context* (2011).

lives, and the lives of society. And if they think historically, they can point to technologies, like the computer, or the automobile, or air conditioning, or television, or jet airplanes, which have fundamentally remade the world. The change that people believe in, then, above all, is technological change; they believe, too, in science, which makes technology possible. They think that medicine will find a cure for cancer. Some people think medicine science can, some day, conquer death. Innovation in science, technology, and medicine have fundamentally reshaped society; as a consequence, the legal order has been fundamentally changed. The flap of some butterfly's wing may be seen as a beginning; but at the end of the causal chain was a hurricane.

1. ON LEGAL CHANGE

Many of us –certainly members of the law and society community– have a special interest in legal change: in legal dynamics, in the way legal systems change, and how and why they change. Nobody has come up with “laws” of legal change, hard-science laws, like the ones astronomers and physicists deal with in explaining the movement of stars, or how gravity operates. The best we can do is to spin out vague, general propositions. For example: that technological change leads to cultural change; and that cultural change, in turn, leads to changes in specifically legal culture; and legal culture leads to changes in the legal order itself.

In many cases, perhaps most, we can easily see how technology sets off a chain reaction that leads to legal change; and we can ignore or elide the intermediate steps (the cultural steps). Take the automobile, surely one of the most important inventions of modern times. The automobile age begins around 1900. As automobiles become common, no longer a toy or a novelty, the law is forced to adapt. Before automobiles, there was very little that one could call traffic law. The automobile brought with it drivers' licenses, speed limits, rules of the road, liability insurance, stop lights and stop signs:--a huge armory of rules and regulations. A bit later came the airplane, and this too had a major impact, and called for more legal interventions: air traffic control, and regulation of air safety; just as the automobile needed roads, the airplane needed airports; and they were built and expanded in every major city.

Besides the obvious changes –traffic law in general– the automobile, and the automotive society, led to many other social changes, some profound, some subtle. It stimulated the building of roads and highways. The automobile also transformed the cities. At first, almost entirely for the good. The automobile made cities cleaner and healthier. It got rid of the huge herd of horses, the flies, the stables, the dirt, the horse manure that was everywhere on the streets. But later on, the tables were turned: the automobile became, in some ways, the absolute ruination of cities. Streets are clogged, traffic moves at a crawl, exhaust fumes pollute the air; highways, freeways and tollways drive a dagger through the heart of the city; the automobile also encourages urban sprawl, the city spills over into the countryside, often destroying the landscape.

The automobile has had a tremendous impact on the way people live. We may dislike the sprawl of the suburbs; but it moved people out of urban slums, into places where they could have rosebushes and a yard for children and dogs to play in. The automobile made it possible for middle class people to become tourists. It expanded the horizons of the public. If a war between, say, Germany and France now seems impossible, tourism and the automobile have to be given some of the credit. The automobile, along with trains, planes, and busses, made the exotic more ordinary. It made a neighboring country less an enemy than a tourist attraction.

Of course, there is always a price to pay.. Thousands die or are injured every year in auto accidents. Railroads and steamboats, in the 19th century, had already begun this process. They killed and injured on an unprecedented scale. Tort law, the branch of law which deals with personal injuries, was practically created by the industrial revolution.²⁵ There have always been accidents; but railroads, steam engines, and steam boats, made accidents more common, increased their scale, and made them a major social problem. The automobile, in the 20th century, added to the toll of deaths and injuries; and to the flowering of tort law.

Each technological change was a kind of butterfly's wing; sometimes, to be sure, a fairly massive, iron butterfly. Each major technological change has its impact, and also a ripple effect –consequences often unpredictable, but cumulative and powerful. Who could

²⁵ See Lawrence M. Friedman, A History of American Law (3rd ed., 2005), pp. 350-366.

have foreseen the impact of the computer on society— on the way people live? A century earlier, the typewriter revolutionized office work. Before the late 19th century, apprenticeship dominated the path to the bar in the United States. A young man— and lawyers were always men, until late in the 19th century— learned his trade as a lawyer’s clerk. He worked in a lawyer’s office, and absorbed legal training, more or less by osmosis. There were some law schools before 1870; but they trained only a small fraction of country’s lawyers. The young clerk in the lawyer’s office learned the trade. But he was also useful to his mentors. He copied documents and ran errands. Once the typewriter (and the telephone) took hold, nobody needed this kind of law clerk any more. Law offices began to hire young women, who knew how to type and take shorthand. The new machines killed the old-fashioned office—including the old-fashioned law office. By 1900, the future of legal training clearly lay with the law schools. Clerkship in law offices rapidly declined. Today, in the United States, apprenticeship is virtually extinct.

2. TOTAL JUSTICE ²⁶

We mentioned how the industrial revolution created the problem of mass personal injuries; and, in so doing, was the background for the development of the law of torts. Tort law continued to expand in the 20th century, so much so that jurists speak of a liability explosion: products liability, medical malpractice, and the erosion of many of the classic defenses and limitations on recovery. The 20th century is also the age of the welfare state: in the wealthy, democratic countries, in particular, it was the age of old-age pensions, free public education, state-sponsored medical plans or medical insurance, and unemployment compensation.

Imagine yourself back in the early 19th century, in the United States, or in France, or Italy, or, for that matter, Argentina or Brazil. Medical science was crude, almost primitive. Most diseases could not be cured. The causes of plagues and epidemics were not understood. Thousands of women died in childbirth. Countless children fell victim to measles and other childhood diseases. Smallpox, cholera, yellow fever and tuberculosis, among other illnesses,

²⁶ The thesis in this section was set out in Lawrence M. Friedman, *Total Justice* (1985).

took the lives of many men, women, and children. Life was precarious in other ways, too. Most people lived on farms. If the rains failed, or locusts ate the crops, the family could be destitute. Untold numbers of people died of starvation in Ireland, in the 1840's, when the potato crop failed. Banks could go bankrupt, and wipe out a family's savings. The business cycle was devastating to small business. Merchants could lose their ships to storms and reefs. There was no welfare state, only private charity; and a cruel and stigmatic system of poorhouses and poorfarms. Life or accident insurance was almost unknown.

Life, in short, was full of uncertainty. The shadow of catastrophe hung over peoples' lives. Nobody could feel secure, even the rich and high-born. In 1817, Princess Charlotte, heiress to the British crown, 21 years old, died giving birth to a stillborn child. No doctor could save her. The methods used by the most prominent physicians would strike us today as worse than nothing. Yet, in the course of the 19th and 20th century, medical science and technology dramatically altered the situation. Knowledge of the role of bacteria and other micro-organisms was a crucial development. Once what caused disease was better understood, pressure grew for ways to deal with those causes. This was a change in legal culture; and it led to demands for measures of public health and sanitation. If clean water is the answer to cholera, then the state must deliver clean water. The butterfly wing— the chlorination of water in New Jersey—that this essay began with was a step along the road.

In the 20th century, the discovery of antibiotics was another major development. In a few decades, medicine progressed in ways that dwarfed the achievement of centuries. Today, when people get sick, they expect to be cured. They expect tests, drugs, operations, procedures, in short, a medical path out of illness. The incurable is considered anomalous. Science will find a way, if not today, then eventually. The effect on economy and society has been enormous. Modern medicine produced a new culture, and this general culture, in turn, produced a new legal culture: a culture of demands on government. This cultural expectation coincided with the growth of the human rights culture; and the result, in most developed countries, was a national health program.

The modern welfare state intervenes massively in society: old age pensions, unemployment relief, free health care and education. Every developed society is a welfare state as well. Even in the United States, where there are gaps in coverage, much of the welfare

apparatus is in place: federal deposit insurance, which protects peoples' bank accounts, disaster relief, old age pensions, unemployment compensation. The legal culture of today is striking different from the legal culture of the 19th century. When catastrophe occurs, people expect compensation, a government program, some legal method of dealing with calamity, so long as it is not the victim's fault, and often even when it is. The chain of causation, that began with the wings of certain butterflies, has ended here too in a hurricane of law.

This brief essay has been about legal culture, where it comes from, and its relationship to science and technology. The subject is vast. I have given a few examples of how this relationship plays out.

Modern legal culture is of course a reflex of contemporary culture. When I refer to modern legal culture, I am speaking of the legal culture in the developed world, including the developed segments of less-developed countries. There is a cluster of elements which these legal cultures have in common. They all proclaim allegiance to democracy and the rule of law. They all proclaim allegiance to the human rights culture. The sexual revolution has gained the upper hand in all of these societies. They all value freedom of choice, and expressive individualism. All of these traits are interconnected. They are each the result of a complex evolution. In each case, we can identify a number of butterfly wings, events and occurrences, small in themselves, which in the aggregate led to the world we live in today.

The legal order, as I have emphasized in this essay, is the product, the effect, of changes in the general culture, in society as a whole. It is more a dependent than an independent variable. To say this, however, does not diminish the importance of law in the modern world. In our world, law is everywhere. As a formal matter, the written laws of any modern country are impossibly large. Volume after volume of statutes, rules, regulations, decrees, executive orders, treaties, ordinances. They impact every aspect of our lives. They reflect society; but once in place, they also have an effect on society.

Standard legal research, alas, is on the whole dry, dismal, formalistic; it takes no account of the cultural foundations of law, or of the impact of law on society. The community of law and society scholars is committed to a broader, more realistic, more empirical, approach to the study of law. Members of this community have accomplished a great deal;

and will produce more insights and knowledge in the year to come. Some of that work, I hope, will shed more light on the topic I touched on in this essay: how science and technology affected modern culture, and through this means, transformed legal culture as well, remaking both law and society.

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