Ciba Foundation Symposium 166

COCAINE: SCIENTIFIC AND SOCIAL DIMENSIONS

A Wiley-Interscience Publication

1992

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Cocaine in perspective

Griffith Edwards

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Abstract. In a medical text published in 1883, Dr Benjamin Ward Richardson FRS denounced the evils of tea drinking, suggesting that it commonly gave rise to an 'Extremely nervous semi-hysterical condition'. That this distinguished Victorian physician could take such a view invites a sensitivity toward the *perspective* within which any debate on drugs is conducted—the historical, cultural and professional assumptions which will colour views as to what needs to be explained and how explanation is to be accomplished. The reality and significance of 'perspective' is further illustrated by examples drawn from contemporary literature which contrast the laboratory and social science approaches to study of cocaine. No one narrow disciplinary perspective on the cocaine problem will suffice; the challenge is to build bridges.

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In an influential text entitled *Diseases of Modern Life*, published in 1883, Dr Benjamin Ward Richardson, FRS, FRCP, Honorary Member of the American Philosophical Society, and bearer of many other distinctions, alluded to several exotic forms of drug misuse which lie outside the remit of the present symposium. He referred to 'The swallowers of haschisch of Damascus and the East, the amanatine drinkers of Kamschatka; the arsenic eaters of Styria . . . '. But he also dealt with one of the more pervasive stimulants of his and our time, and thus I feel at liberty to quote him a little more fully. He wrote:

> 'Some functional nervous derangements are excited by fluids commonly consumed with, or as foods. *Tea* taken in excess is one of these disturbing agents. The symptoms . . . are . . . a lowness of spirits amounting to hypochondriacal despondency.
>
> In poverty-stricken districts, amongst the women who take tea at every meal, this extremely nervous semi-hysterical condition from the action of tea is all but universal. In London and other fashionable centres in which the custom of tea-drinking in the afternoon has lately been revived . . . these same nervous symptoms have been developed in the richer classes of society, who, unfortunately, too often seek to counteract the mischief by resorting to alcohol stimulants. Thus one evil breeds another that is worse.'

The perspective from which Richardson developed these ideas can only be understood within the wider context of 19th century medical thinking, with its mixture of moralism and simple faith in science, its campaigns for public health and its fervid belief in the dangers of social degeneration, and its frequently expressed notion that psychologically women were specially vulnerable creatures. Richardson believed in the virtue of cold baths and warned against idleness. In short, he saw the human condition from a Victorian perspective.

The purpose of a chairman's introduction is that of a prologue before the curtains go up on the play. What I want to suggest is that the question of the perspective within which we debate drug problems is important. Let us move from the 19th century argument by moving from Richardson and tea, to a more recent text and the very centre of our present concerns, cocaine. *Cocaine 1980* (Jeri 1980) is a proceedings volume emanating from a meeting held in Lima, in Peru: Marian Fischman (who is taking part in the present symposium), Chris Johanson and Charles Schuster were among the participants. Here is a quotation from a chapter in that book on 'The evaluation of cocaine using an animal model of drug use', written jointly by Schuster and Johanson:

> 'The relevance of data from animal studies to the human problem of drug abuse is based upon the validity of two assumptions: (1) drugs that are reinforcers in infrahuman organisms can serve the same function in humans, and (2) humans and animals are comparable in their sensitivity to the effects, including the toxic ones, of the self administered drug.'

There is nothing in Schuster and Johanson's recently stated scientific position from which any of us is likely to dissent. Let us, though, turn the pages onwards in these same conference proceedings to the chapter by Fernando Cabieses (1980) on 'Ethnological aspects of coca and cocaine':

> 'The author reviews ethnological knowledge about the habit of coca chewing, pointing out the lack of scientific reasons to support repressive and eradiction laws. . . . The act to share coca and chew it, jointly with other people, is an important event which seals the relation of brotherhood and confidence among the participants . . . the factors which have caused condemnation of coca throughout the last four centuries, do not exist and have never existed among the natives. There always have been interests originated in the conflict between the occidental and the Andean culture.'

Here again, we are likely to agree with the author. We agree with Schuster and Johanson and the perspective of the laboratory scientist, and we also agree with, but perhaps feel a little threatened by, Cabieses' hint that the laboratory view—high science, the view from North America—is blind to certain larger realities. Debate on cocaine invites more than one perspective.

If I can group together several different sciences, one highly important viewpoint from which we shall certainly be invited to see these issues over the next few days might, in shorthand, be described as that of the 'laboratory scientist'. Under that heading can be put together behavioural pharmacology, the study of the biological basis of reward mechanisms, the molecular pharmacology of cocaine, and so on. The scientific credentials of such approaches are assured, their funding is relatively generous, and their technical sophistication is enviable. Their unit of analysis extends over a spectrum running from the molecule to the laboratory animal or volunteer experimental subject.

A second perspective might be labelled that of the social scientist, including the historian and the economist. Here the data sets are often dubious, the inferences often outrun the data, and the investigators seek to deal with everything which goes beyond the point where the sensibly cautious laboratory scientist stops. These kinds of investigators do, though, employ a broader-angled lens than their laboratory colleagues. They will see the peasant in the Andean landscape, and surviving in the hard conditions of the *alto plano*, chewing coca and 'establishing brotherhood', rather than focusing down on the synapse or the neurotransmitter.

A third perspective which is going to enter our debates is that of medicine. In some ways, medicine is a bridge between the laboratory and the social science view, if only a rather rickety pontoon construction. Medicine values laboratory science, but is lost (and damned) if it ever forgets the social dimension. As Virchow put it, 'Medicine is a social science in its very marrow'.

In reality this symposium will play host not to just two or three perspectives, but to as many viewpoints as there are individual participants in the room—we each bring to this symposium our own lumber of assumptions. Let me end this prologue by throwing down two modest challenges to the players in the play which is shortly to begin.

(1) Firstly, rather than dismissing Benjamin Ward Richardson as a quaint figure of his distant time, can we, with his views on tea drinking in mind, identify the influences which threaten to dictate and distort our own perceptions of the cocaine issue? What contextual values, given by our wider cultures and the cultures of our professional training, shape our views as to what here has to be explained, how it is to be explained, the likely nature of explanation, and our rights as explainers?

(2) The second challenge relates to the possibility of building bridges between different perspectives. As has already been emphasized, what is both fascinating and difficult about the study of drug problems is that they do not allow retreat to the comfort of any one dominant and assured perspective. It would be all too easy to conduct the symposium in terms of a debate which switched from one alternative perspective to another with polite nods, but no meeting points. The difficulty in finding common ground is not going to be overcome by recourse

FIG. 1. A chronic preparation permitting intravenous self-administration of drugs by rats. A flexible stainless steel harness is attached to a piece of needle tubing connected to a remote infusion pump. The other end of the needle tubing is cemented to silicone rubber tubing which runs subcutaneously and was inserted into the external jugular vein. (From Thompson & Pickens 1969 with permission of Churchill Livingstone.)

to easy platitudes about the need for multidisciplinary research. Let's, at this point, look at just two images which suggest that a platitudinous approach to bridge-building is unlikely to suffice (Figs. 1 and 2).

How are we, in any honest way, to deal with such disparate images, other than by turning a blind or dismissive intellectual eye to the one or to the other? The challenge to this symposium is that of trying to develop a perspective which can contain both images, and of actively and intentionally seeking connections.

FIG. 2. Peasant woman arrested for involvement in coca paste-making activities in the Upper Cochabamba Valley in Bolivia, in 1985. (From Healy 1986.)

So much for the prologue and its invitations to perspective. The play now begins.

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Cocaine's history, especially the American experience

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Abstract. The history of cocaine in America can be traced to the late 19th century. After the discovery of its physiological and psychological effects, cocaine figured in consumables as diverse as hay fever remedies, local anaesthetics and soft drinks. The development of its different usages as well as eventual control of its use through restrictive legislation followed a different pattern in America from that in Europe. In the United States, national laws to control drugs faced constitutional obstacles until the era of World War I. Initially acclaimed as an ideal tonic, within two decades of its introduction in the mid 1880s cocaine was perceived as an extremely dangerous drug. By the 1930s cocaine had declined in use and in the 1960s, when it gradually emerged again, almost no public memory existed of the earlier 'epidemic'. Once again this substance evolved into a threatening and seductive hazard with some similarities to the earlier episode.

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Cocaine first appeared on the commercial market in the mid 1880s. In earlier decades the appeal of cocaine in the form of extracts from the coca leaf had become increasingly popular. The best-known of these extracts was *Vin Mariani*, a coca wine product that began to be produced in France before 1870. French coca wines, of which Mariani's was the most prominent, developed a European and American following that stimulated the development of other products, one of which evolved to become Coca-Cola, a non-alcoholic coca drink that eclipsed its inspiration in world-wide favour (Helfand 1988, Kahn 1960).

Mariani's wine was advocated for lassitude, poor appetite, melancholy—in short, as a general tonic for the body and mind. In the era of neurasthenia, the preparation became a common remedy and was so recommended by Dr Gilles de la Tourette, among others. Coca extract was not confined to restoring debility, but it was also considered an aid to improve the normal state. Writers, inventors, singers, athletes, painters and sculptors sang praise (Mariani 1901). In the late 19th century an exhibition at Leamington Spa in England not only gave Mariani's wine a gold medal and diploma, but named it the 'wine for athletes'.

In Mariani's own publications its use in athletics is clearly promoted. In 1896 it was reported: 'Professional bicyclists and athletes, after careful trials of our and preparation of others . . . invariably give the preference to our Coca preparations'. It is noteworthy that in this early phase of cocaine's use, the assumption prevailed in Mariani's publications that athletes would naturally seek out the most effective aids to performance. This point of view—in such contrast to our attitude today—is supported by a list of athlete-customers of the 1890s who employed his invigorating wine (Mariani 1896).

The clergy likewise valued the wine. Pope Leo XIII awarded Angelo Mariani a gold medal; Cardinal LaVigerie, Primate of Africa, wrote that 'Vin Mariani gives to my "White Fathers", sons of Europe, the courage and strength to civilize Asia and Africa'. A Capuchin priest gave the wine credit for his ability to preach 512 times in one year. Anyone in a religious vocation or operating an orphanage received a discount on their purchase of the tonic.

In 1892 Thomas Edison sent his photograph to be included in Mariani's compilation of testimonials. Charles Gounod sent Mariani an autograph score of the Soldier's Chorus from *Faust*, but with words praising Vin Mariani. Jules Verne acclaimed it. The Prime Minister of France, Félix Méline, announced he had slightly adjusted his anti-alcohol principles so he could drink the elixir, while his Minister of Justice claimed it made each imbiber a better man and his Minister of the Interior attributed the strength of the Cabinet to the fact that all its members drank Mariani's wine (Mariani 1901).

Mariani's preparations, including a wine, elixir, pastilles and tea, and other less famous concoctions, helped prepare the way for the welcome for pure cocaine in the 1880s. Already in the United States extracts of coca were reported to be a cure for alcoholism and morphine addiction (Huse 1880). This is one of the attributes of cocaine that drew Sigmund Freud's attention to it in 1884: he was seeking a cure for the morphine addiction of his friend Ernst von Fleischl-Marxow. Freud was also interested in the ability of cocaine to increase endurance. Dr Theodor Aschenbrandt had already investigated this characteristic on a battalion of the Bavarian artillery in 1883, using pure cocaine hydrochloride produced by Merck & Company (Aschenbrandt 1883). This energizing feature of coca leaves had been persuasively argued in 1876 by Professor Sir Robert Christison in Britain. Professor Christison, at age 76 and while President of the British Medical Association, found he could walk 15 miles and not become fatigued after chewing a quarter-ounce of coca leaves (Christison 1876). Still, from Freud's perspective, Europe lagged in its use of coca and cocaine. He saw 'some promise of widespread recognition and use of coca preparations in North America, while in Europe doctors scarcely know them by name' (Freud 1885).

One reason for the differing receptions and uses of cocaine can be found by comparing the legal status of the drug and the extent of professional organization in the United States with that in Europe. I am cautious about commenting on

European practices and laws regarding substances like cocaine in the 19th century, for this is an area in which extensive research remains to be done, but I will make some general comments. First, the legal status of cocaine in the United States made it more easily available than in Europe. Aschenbrandt and Freud obtained their cocaine from pharmacists who had been supplied by Merck of Darmstadt. German pharmacy laws were careful to restrict powerful drugs to pharmacies and physicians. In Britain, cocaine apparently fell under the Pharmacy Act of 1868 which limited the availability of certain drugs to pharmacists and physicians. In order to obtain a concentrated or pure form of substances like cocaine, the consumer would be required to be known to a registered pharmacist, to sign a registry and to receive the chemical in a bottle prominently labelled 'poison'. Over-the-counter remedies containing small amounts of cocaine, such as 'medicated wines', could be sold at licensed premises, but these were in forms that did not permit inhalation or injection. The possibility of addiction from these mixtures existed, but the likelihood was small compared to that from pure cocaine salts or injectable solutions. Certainly, after the mid 1880s, cocaine spilled out of professional channels into other hands, but the legal and traditional contexts of availability were the professions of pharmacy and medicine (Musto 1987).

In the United States, however, there existed no national pharmacy or medical laws and the health professions were only in the early stage of organization. Laws controlling the practice of pharmacy and medicine were the responsibility of the several States, according to the contemporary interpretation of the United States Constitution. At the beginning, in 1884, cocaine fell under no law controlling its access in the United States. Furthermore, no law controlled advertising claims for cocaine. The aura of enthusiasm that surrounded cocaine's entry into US commerce, as well as the actual euphoriant effect of the drug, rapidly spread cocaine's use throughout the United States (Musto 1989). As an example of cocaine's entry into everyday life in America, one could note that by 1886 the drug was chosen the official remedy of the United States Hay Fever Association (Hammond 1887b). A former Surgeon General of the Army and a prominent neurologist, Dr William A. Hammond, promoted a coca wine that he boasted had four times more cocaine per ounce than a popular foreign product (Hammond 1887a). Cocaine appealed to Americans and they had far more legal access to it than Europeans.

So far the stimulant properties of cocaine have been emphasized. There were, of course, other specific medical uses which created little controversy. The first of these was described by one of Freud's colleagues, Dr Karl Koller, who demonstrated in 1884 the ability of cocaine to anaesthetize the surface of the eye (Koller 1884). Soon Dr William Stewart Halsted, then a physician in New York, began experimenting on himself and others with injections of cocaine in his attempt to determine the value of cocaine as a local anaesthetic. He and his colleagues were successful in establishing the ability of injections near

peripheral nerves to block pain conduction, but the penalty was addiction to cocaine and a profound deterioration of professional ability. Halsted later became Surgeon-in-Chief of the new Johns Hopkins Hospital, but only after a difficult period of treatment that separated him from cocaine. He then started taking morphine, possibly to overcome the desire for cocaine, became addicted to morphine, and remained a morphine user for the remainder of his life (Olch 1975).

Halsted was not the only casualty to cocaine in the early years of its introduction. Compilations of complications appeared in leading medical journals (Brower 1886, Mattison 1887). Yet cocaine continued to be defended by prominent physicians who ridiculed the fear that cocaine had unusual dangers. Dr Hammond has been mentioned. He tried cocaine on himself in large doses and recovered. He assured his readers that the cocaine habit was no more severe than that of coffee or tea, while the unique properties of cocaine were remarkably helpful (Hammond 1887a).

The extravagant claims for cocaine made by professional leaders such as Hammond may have had more impact in the United States, where the public had greater access to the drug, than in Europe, where the medical and pharmacy professions held a closer rein on cocaine's availability. Whatever the reason, it is impressive in retrospect that lurid examples of cocaine's dangers at the very beginning of its availability did not prevent its use from spreading to the extent that 25 years later cocaine would be described by an official government report as the most serious drug problem ever confronted by the United States (Wright 1910).

In the decades after cocaine's introduction, two levels of availability eventually emerged. As laws were being written in reaction to easy access, beginning with local and State legislation and finally in 1914 at the national level, the drug was sold illicitly. Studies of the illicit market in New York City between 1907 and 1914 suggest that the unit sale on the street was commonly one to two grains, or approximately 100 mg. This would be sold as a powder in an envelope for a typical price of 25 cents. This illicit price was roughly equivalent to the hourly wage of an average industrial worker. Curiously, in the second American cocaine epidemic, the price of cocaine on the street in the late 1980s was about the same for the same amount of substance—an hour's wage for 100 mg (Musto 1990).

In the licit market, the arena of French coca wine, Coca-Cola, and some other forms of cocaine such as chocolate cocaine tablets compounded by your local pharmacist, the typical unit dose was much smaller. With regard to Coca-Cola, we know only the amount of cocaine contained in a bottle in 1900, the last year of its presence. It was one four-hundredth per cent, or 2.5 mg per 100 ml (Coca-Cola Bottling Co. of Shreveport v. Coca-Cola: 1983). For a six ounce bottle this would be about 4.5 mg. I am informed by an expert on clinical cocaine use that this amount is at the low end of perception by a person who does not use large amounts of cocaine—that is, an average person. Also, Coca-Cola at

that time contained caffeine which added its stimulating effect to the small amount of cocaine. Interestingly, recent animal studies suggest that cocaine's impact is potentiated by caffeine (Schenk et al 1989–1990).

The unnamed foreign coca wine alluded to by Dr Hammond had, he complained, only a half-grain of cocaine to the pint. Taking 1½ ounces as the measure of a wineglass, the amount of cocaine in the recommended dose would be 3 mg. In 1892 a formula appeared in *The Chemist and Druggist* for chocolate cocaine tablets. This called for dividing three grains into 48 tablets, giving each tablet 4 mg of cocaine (The Chemist and Druggist 1892). In Britain a popular 'medicated wine', Hall's Wine, contained one grain of cocaine in 26 ounces, or 4 mg in a 1½ ounce wineglass (House of Commons 1914). One could say that about 4 mg in the unit dose was probably the minimum amount of cocaine in easily available compounds. An analysis of coca wines in 1886 reported a range of 5 to 12 mg of cocaine per ounce (Mariani's wine was recorded as 8 mg per ounce) (The Druggists Circular 1886). The range, then, for popular tonics was from 3 mg to 18 mg in the single dose. In the medicated wines it should be noted the cocaine was in a solution containing about 15% absolute alcohol.

These everyday consumables promoted the positive features of cocaine as an invigorating tonic, but gradually the image of cocaine changed in American society. The alarm caused by cocaine appears to have been linked not to the tonics, but to the inhalation or injection of pure cocaine. From an expensive medicine in the first few years of commercial production, cocaine fell in cost and expanded in distribution (Musto 1990). And yet, in spite of the accumulating record of personal tragedies associated with cocaine use, about 20 years passed before New York State resolved to bring the public's easy access to cocaine under control. Under public pressure, Assemblyman Alfred E. Smith (two decades later the Democratic candidate for the presidency of the United States) introduced a Bill into the New York State legislature that would give physicians and pharmacists control over cocaine. Enacted in 1907, the law did not limit the amount of cocaine the health professionals could provide. The assumption of the law was that the good judgement of the professionals would effectively curb irresponsible use.

As indicated above, an illicit street market was operating after passage of the anti-cocaine law and it appears to have been essentially unaffected by legal access via physicians' prescriptions. For seven years the anti-cocaine laws were strengthened in New York State, and they then were matched by the first federal anti-cocaine law, the Harrison Act of 1914. The Harrison Act also dealt with opiates of which small amounts were allowed in over-the-counter remedies, but for cocaine no amount was permitted without a prescription (Musto 1990).

Cocaine had moved in the 30 years after 1884 from a tonic proclaimed to be without adverse effects to a drug under the most severe restrictions of any substance still permitted for medical purposes. The 1920s were punctuated by cocaine scandals in Hollywood and other dramatic revelations, yet the trend

appears to have been downward by the 1930s. The New York City Mayor's Committee on Addiction reported in 1930 that cocaine addiction was no longer a problem, although it had been a serious one 20 years before (Mayor's Committee 1930). The level of cocaine fell so low that by the 1950s it was cited by narcotic law enforcement authorities as an outstanding success of that earlier 'war on drugs' (Harney & Cross 1973).

Cocaine began to reappear in the United States in the late 1960s, as the nation entered another era of drug toleration. Marijuana rapidly increased in use, particularly among youth, and other drugs appeared, including LSD. The similarity in response to cocaine's introduction to the United States 80 years earlier is striking. Cocaine was again seen as a tonic, a harmless, non-addictive lift for everyday life that, for some perverse reason, in 1970 forgotten by almost everyone, was restricted by the most severe penalties. If in the 1880s Dr Hammond calmly compared cocaine use to the tea or coffee habit, one could read a century later that the pattern of cocaine's intranasal use was similar to that of 'peanuts or potato chips' (Van Dyke & Byck 1982)*.

Once again, starting out expensive, cocaine use signified sophistication and the ultimate euphoria. During this time one could locate accounts of cocaine's dangers, but experts and the media commonly adopted a relaxed attitude towards cocaine. In 1980, one prominent psychiatric textbook took cognizance of those who abused cocaine, but assured its readers that use of cocaine two or three times a week was probably safe (Grinspoon & Bakalar 1980). When 'crack', a smokable form of cocaine, appeared in the United States in about 1985, the intense desire for the drug among users and its low cost alarmed the American public. Cocaine laws, which had been softened as a result of widespread use, were now hardened and were included with other anti-drug legislation in two major compendia, the Anti-Drug Abuse Acts of 1986 and 1988.

We have not seen the eclipse of cocaine in the United States and we cannot echo the words of the New York Mayor's Committee of 60 years ago that cocaine addiction used to be a problem, but we have seen enough over the past 25 years to make some preliminary comparisons between the two episodes.

The major similarity is the initial enthusiastic acceptance of cocaine followed many years later by an intense public rejection of the drug in any amount. It is noteworthy that public memory of the earlier epidemic had faded to a degree that optimistic claims for cocaine in the early 1970s were unaffected by past condemnation of the drug. The loss of public memory for the earlier era of disillusionment with cocaine is itself a useful research topic.

A second characteristic is the time required for the transition from tolerance to intolerance of cocaine. About 20 years passed between the introduction of cocaine in the mid 1880s and the Al Smith anti-cocaine law of New York State,

*Dr Byck informs me that this phrase was added by an editor, and that it did not appear in the text submitted and does not appear in the authorized reprint of the article.

and 10 more years before the federal government prohibited cocaine except for medical purposes. With regard to the Harrison Act, one should note that a federal law affecting local practitioners was extremely difficult to frame, because of constitutional restrictions on the central government, and delayed action for some years.

About 20 years passed between cocaine's reintroduction in the late 1960s and the recent federal anti-drug abuse acts. These periods are the length of a generation, a rather long period for a drug that is eventually seen as the most fearful of habit-forming substances.

A major difference, however, should be noted between the two episodes. In the first, there were no laws against cocaine at its introduction: increasingly severe laws followed public opinion. In the 1960s the harshest laws were in place when a new generation of Americans welcomed cocaine as an excellent and relatively safe stimulant. The long period of transition to a fear of cocaine and its users led many to believe that the pre-existing laws were built on misconceptions and futile in their efforts. Further, a tolerant attitude toward cocaine while the most severe penalties existed created the opportunity for a lucrative and fairly safe market in illicit cocaine trade over a period of many years. Our perception of the power of the law to affect drug use has been quite different in this era from that in the previous one, when the most severe laws were enacted as the demand for cocaine was apparently in decline.

Finally, the drug problem is commonly thought to be a serious contemporary problem that requires little more study than talking to those now involved with drugs. There is, however, a past that is relevant to our current problem and the way we conceptualize and approach it. Through this essay I have attempted to demonstrate that both the European and the American experiences with cocaine are worthwhile fields for historical investigation.

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DISCUSSION

Kleber: During that period early in this century when the street price of cocaine in New York was roughly the same as the hourly wage of an industrial worker (25 cents for 100 mg), what was the price paid if it was obtained by medical prescription?

Musto: It has proved remarkably difficult to answer that. Of course, the prescription price varied from one pharmacist to another, but even the American Institute of the History of Pharmacy lacks information on that interesting question. We know that the wholesale cost when cocaine was purchased in

kilogram and larger lots on the international market was about 25 cents a gram, and we are reasonably certain that the illicit street price in New York City from 1907 to 1914 was ten times that minimum. I assume the prescription price would be less than that multiple. One must keep in mind that in the United States in the period I am discussing, about 1900 to 1914, the average industrial hourly wage was between 20 and 25 cents. Interestingly, the cost, in real terms, of street cocaine was about the same then as it was in the 1980s (Musto 1990).

Kleber: You said that by the end of the first era, in the 1930s, the laws had become very strict against cocaine possession or sale, and therefore when cocaine use increased again (in the late 1970s), the laws were already in place. What do you feel was the role of those laws in diminishing cocaine use in the *earlier* period? I am unclear whether the laws came in as the decline in cocaine use was already beginning, earlier this century, or whether they helped to cause that decline.

Musto: The laws represented a powerful shift in attitude toward cocaine that peaked in the period shortly before World War I. The Harrison Act of 1914 eliminated any legal availability of cocaine without a physician's prescription—the first drug to be so severely restricted. I believe the laws helped speed the decline of cocaine use over the next 20 years or so, although the chief reason was the changed public attitude. Still, history doesn't allow control groups. But I don't believe that anyone could have persuaded a large number of Americans in that era to forego legal sanctions against cocaine. Americans demanded laws against the easy availability of cocaine and the drug proved to be the most successfully prohibited of any previously widely used psychotropics.

As for the timing of the laws in relation to the peak of use, I cannot yet say anything confidently regarding cocaine, but the anti-opiate laws generally came after the peak of consumption in the mid 1890s. That isn't surprising, however, because the fall in demand had to gain momentum for a consensus that strict controls were necessary. I suspect the same for cocaine, but cocaine's rise and fall were swifter than those of the opiates.

Finally, the experience regarding law enforcement of those who have lived through our current cocaine episode and that of our great-grandparents is quite different. We have, I believe, more questions about the efficacy of law enforcement, at least of legal statutes, than our ancestors had. They saw the imposition of legal restrictions as demand declined and popular attitudes hardened against cocaine. Our experience has been that the most severe legal restrictions did not prevent a resurgence of cocaine and that law enforcement is weak against popular enthusiasm for cocaine. We have had perhaps two decades of law enforcement trying to curb the use of cocaine with less than satisfactory results. So although both epidemics may eventually have a similar 'shape', we are less sanguine about the unique ability of severe laws to curb use.

Uchtenhagen: I wonder how much is known about the characteristics of people taking cocaine in the two US epidemics, and in different phases of the epidemics?

Musto: Cocaine in the 1880s was initially quite expensive. Freud complained about this in his first essay *Ueber Coca* (1885). Its first distribution in America appears to have been to the middle and upper classes as a new and sophisticated treatment for hay fever, sinus problems and melancholia, and as a tonic for what were then called 'brain workers'—professionals in medicine, law and religion. Soon the cost became lower and it was more commonly available in patent medicines for asthma, toothache and hay fever and in common drinks. The non-medical use also spread and seemed worrisomely popular among criminals, prostitutes and in the South among African-Americans. These negative perceptions helped fuel the drive for legal control, but there is reason to believe that use by Blacks in the South was not greater than that by Whites (Green 1914).

There is, then, a pattern similar to what we have experienced in the 1970s and 1980s: cocaine is used at first by the affluent and later undergoes a mass distribution, the effect of which is to create great concern among the public about the behaviour of 'lower classes' using or seeking cocaine. Commission of crimes to get money to buy cocaine was a common complaint when cocaine was unrestricted, as well as now. Cocaine has not been cheap, if the user developed an addiction, in either era.

Kalant: When Hans Maier wrote his book on cocaine in 1926, his historical review showed very clearly the evolution of use that you described; but, by that time, his patients consisted either of physicians who had access to cocaine professionally, or of people who may have been gainfully employed in 'respectable' fields, but became acquainted with cocaine through the *demi-monde* of prostitution or petty crime. Cocaine had obviously already fallen into disrepute, and was seen as a drug that was unacceptable to the majority of society. This would certainly fit with the downturn in use and its virtual disappearance during the middle part of this century, at least in Europe and North America. The relation between the change in public attitude and the enactment of drug control laws fits well with the argument that laws are really a codification of public opinion rather than a determinant of that opinion; they are passed when the public demands the laws, and are disregarded when the public no longer believes in what the laws represent.

One question: how exactly did cocaine first appear as an illicit commodity in the United States?

Musto: My view is that as there became greater concern over cocaine, in the 1890s, physicians and pharmacists became more hesitant in providing it, and it was then easily available only from a minority of pharmacists or some physicians, or from other sources in which the price was somewhat higher. The reason we know about the illicit price in New York City after the 'Al Smith' anti-cocaine law of 1907 is that detailed reports of people arrested for violation of that act then appeared. We found from those reports that there was a steady price for illicit cocaine of about 25 cents for a packet containing approximately

100 mg. I don't know when that street market began, but there are reasons to believe that it may have started late in the 19th century or early in this century.

Kalant: Even before the laws were enacted, then?

Musto: In New York City, I believe there was a street market before the 'Al Smith' Act of 1907, although I am not sure I can call it 'illicit'. I believe this to be likely because the growing fear of cocaine was leading health professionals to be more and more circumspect in providing the drug, and a street market would make it available with no questions asked, at any time and for a price that, although not cheap, was affordable.

Kuhar: In the earlier cocaine epidemic in the US, what was the distribution system? Was it like the one that exists now, with cocaine being smuggled from South America, and so on?

Musto: Smuggling may have occurred, but there were no serious restrictions, such as very high tariffs on cocaine and coca leaves. It's hard at this date to estimate smuggling. The most typical distribution system would start with coca leaves imported from South America. US drug companies would extract cocaine from these, or import cocaine itself, often from Germany. Cocaine would then be distributed by syndicates in New York City and sold on the streets by dealers ranging from newsboys to full-time gang members. Unlike the last two decades, there was no enormous overproduction by illicit producers to compensate for interdiction. After the Harrison Act (1914), evidence of smuggling appeared and there were diversions from licit supplies, but by this time the growing disenchantment with cocaine, coupled with legal penalties, gradually reduced demand in the United States, so that by the 1930s cocaine had become a minor problem in New York City.

Negrete: I feel rather uncomfortable with the comparison between the current cocaine epidemics and the one occurring in the first decade of the century. I am not sure they are the same thing. We have no idea, of course, of the prevalence of cocaine use then; I think there were no population surveys. But I suspect that there were not the same patterns of use. Is there any precedent for smoked cocaine before the recent episode, for example?

We all smile when we hear the praises given to, say, Vin Mariani, but they were not off the mark; that is exactly what it did! I am sure that if we had such preparations of cocaine now, we would have the benefits of it. The energy that is given, *without* the immediate central nervous system perception of stimulation, is a very important difference from what you see in cocaine abuse. Mariani in fact copied from the Incas, who knew about the energizing properties of the drug. They measured distances for their couriers by cocadas. A *cocada* was a pouch full of coca leaves; so the number of *cocadas* you need to chew in order to get to your destination is a way of telling you how far you have to go!

Musto: There were coca cigarettes and coca cheroots produced by the Parke-Davis company within one year of cocaine's introduction into the United States, in 1884, and by other companies, but whether coca paste was smoked or not,

then, I am not sure. There was complete availability of hypodermic syringes and cocaine in the late 1880s and 1890s, so a user could either sniff it, use an atomizer to inhale it, which was also provided in the 'cocaine kits', or inject it. There was no limit to what you could take. But I don't know of any smoking apart from the cigarettes and cheroots composed of coca leaves.

Edwards: Dr Musto, you are suggesting, very persuasively, that an epidemic may reach its peak and start to decline because of social resistance—when people turn against it—rather than because of the law; then the change in the law follows and may reinforce the decline. But are you sure that you are right? Do epidemics of drugs 'burn themselves out'? What about an alternative explanation in terms of changes in economic or market determinants? Or some other drug moving in to substitute for cocaine? And, in terms of your theory, who 'turns against'? Do the media turn against cocaine, or does some emergent social movement? You are making such an important assertion, but how firm do you think the evidence is?

Musto: First, my observations are based chiefly on a study of the American experience, in which a rapidly expanding legal consumption of cocaine elicited a strong opposition to the drug and strong support for the enactment of the most severe legal restrictions applied to any drug still available for medical purposes. I believe the reduction in cocaine use during the 1920s and 1930s was facilitated by the criminal justice system. I can't establish this by re-running the experiment without anti-cocaine laws, but I think it is reasonable to assume that a widely shared conviction of cocaine's dangers would lead to narrowing those niches in society in which cocaine continued to be used and that legal sanctions would further discourage use—in that context of public disapproval.

Second, the change in attitude toward cocaine and the opiates was part of a much broader movement in the United States against risk-taking behaviour that flourished from about 1890 to 1920. This concern was not confined to the prohibition of alcohol (1920–1933) but extended to national laws affecting pure food and drugs, meat inspection, clean streams, preservation of the forests and natural resources, and so on. We are now in another era similar that of nearly a century ago.

With regard to drugs like cocaine, public opinion moved from seeing them as useful if well-understood and used in moderation, to seeing them as bad in any amount, unless required for medical purposes like analgesia.

When this change took place, research and treatment were both adversely affected. When drugs were seen so negatively, the solution to the drug problem appeared to be a simple one—separate the drug from the user. Research interest fell, and earlier optimism about treatment by medical means almost disappeared in the United States. Law enforcement became the public's focus, as it is becoming now in the USA. So the change in attitude toward drug use carried with it many related consequences and was part of a larger movement aiming at risk reduction in the things we take into our body and in hazards in the environment.

Gerstein: On this point of what effects the law has, we should pay attention to the distinction between use by the elite and by the *demi-monde*, although in the USA it is perhaps more important to take the rather different dimensions of use by Whites and use by Blacks, because I think the drug laws in the USA have been used most aggressively and extensively against Blacks.

The spread of cocaine use, particularly in the middle class and among wealthier people, White or Black, during the period of the present cocaine epidemic in the USA, could be viewed as an instance in which, no matter how harsh the laws on the books, they were never applied with force to the White elite but were prosecuted much more vigorously among the poor, and the Black poor particularly. This might explain why, despite the apparent difference in the status of the law between the early and later periods of cocaine use, we see in both cases an epidemic occurring among White users who are well-off and otherwise respectable, and a strong backlash of prosecution and police action when cocaine use becomes strongly identified with Blacks.

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Epidemiological research on cocaine use in the USA

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Abstract. In the study of cocaine, epidemiology offers a way to reckon the experience of human populations, from time to time, from region to region, from community to community, and from group to group. Continuing surveillance of cocaine experiences in diverse segments of the United States population has allowed us to plot the course of our most recent cocaine epidemic in more detail than in the past. Still, much remains to be learned about the dynamics of the cocaine epidemic before public health agencies or anyone else should ride to glory on the descending limb of this epidemic curve. Beyond basic surveillance, epidemiology has the capacity to teach us about the conditions under which human cocaine use starts, is maintained, and stops, including the array of perceived and actual consequences of cocaine use that may determine specific patterns of use. In this respect, there is some value in making a chronicle of cocaine users' life experiences, with a comparison to the life experiences of others. However, the perceptions of cocaine users do not always map onto observations made under controlled conditions of laboratory research. Finally, it is not essential for epidemiology to rely solely upon what individuals perceive and report as causal linkages between cocaine use and their other life experiences. One effective alternative is to use the epidemiological case–control method and related strategies to probe suspected causal linkages involving cocaine. As demonstrated in recent research, these strategies have a resolving power that goes beyond that of standard epidemiological survey reports. Of course, the resulting epidemiological evidence does not stand alone. Rather, it complements laboratory and clinical research, giving a more complete view of cocaine's impact on human health.

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In this paper I intend to touch on three epidemiological topics that concern cocaine use in the United States. The first topic is our most recent cocaine epidemic. A time series of prevalence estimates, shown in Fig. 1, may suggest that the epidemic has recently ended or subsided.

For those who lead public health agencies or government, there is temptation for an exhilarating ride to glory on the descending limb of an epidemic curve such as this one. The ride is a moment of pleasure mixed with apprehension.