

Chapter 5

Are the data reliable?

It would be a waste of time and energy to analyze and try to make sense of flawed or unreliable data. Ensuring the reliability of experimental data is a cornerstone of the natural sciences. In physics there is a proven procedure through which the validity of experimental results is established. Every time a researcher claims to have observed a new physical phenomenon other teams around the world try to replicate his (her) results. If their observations are consistent with those obtained by the first team, the phenomenon will be given the status of a new physical effect often named after its discoverers. The Foucault pendulum (1851), the Zeeman effect (1902), the Aharonov-Bohm effect (1959) are a few examples among many others. On the contrary, if the claimed result cannot be replicated, the physics community comes to the conclusion that the first observation was spurious. A case in point was the flawed discovery of cold fusion in 1989 which will be described in some detail below. In what follows this phase of verification will be referred to as the *replication procedure*. It provides an efficient way through which flawed observations can be eliminated. Unfortunately, there is no similar procedure in the social sciences even in cases where replication would be possible. In a previous chapter we mentioned the fact that thirty years after its discovery the reality of the Werther effect is not yet clearly established. This study could have been replicated in all industrialized countries in which monthly suicide statistics are published. It is true that related studies had been done but most of them had little or no overlap with Phillips's seminal paper (1974). In short, the efforts of researchers were juxtaposed and dispersed rather than being focused on a definite issue. Accumulating data until the evidence becomes overwhelming does

not seem to be a top priority on the agenda of social scientists.

The chapter is organized as follows. First, we examine two replication episodes: one in which the initial observation was confirmed and another in which replications lead to observations at variance with the first experiment. These episodes also emphasize several important features of the replication process, in particular the fact that the replications are by no means identical to the first experiment. The resemblance is restricted to a set of crucial parameters. Distinguishing between the parameters which are crucial and those which are not is precisely one of the main purposes and achievements of the replication phase. In the second part of the chapter we discuss two cases in which facts and data have been misrepresented. The first case describes a statistical glitch which resulted in errors of as much as 30% in the suicide rates of New York State. The second case-study concerns an historical issue, namely the relations between Japanese people and occupation forces in the wake of World War II.

1 The replication process for the Foucault pendulum experiment

Named after the physicist Léon Foucault (1819-1868) the Foucault pendulum experiment was conceived to demonstrate the rotation of the Earth on its axis. Its principle can best be explained by assuming for the sake of simplicity that the pendulum is located at the North Pole. Will its plane of oscillation rotate with the earth or will it remain pointing in the same direction while the earth rotates underneath? The observation shows that it is the second alternative which is correct. This means that an earth-bound observer will see the plane of oscillation of the pendulum describe a full circle in 24 hours. In other words the period of the phenomenon is $T = 24$ hours. Applied to a pendulum set up somewhere on the equator the same argument says that an observer will see no changes in the orientation of the plane of oscillation which means that in this case T is infinite (Fig. 5.1). An interpolation argument tells us that for a pendulum set up somewhere between the North Pole and the equator $T > 24$ hours. For instance, in Paris $T \simeq 32$ hours. The experiment was publicly performed

by Foucault on March 31, 1851. It attracted great attention and in following months its replication was attempted in more than 10 European cities as well as in some non-European countries. Table 5.1 presents a sample of these experiments. Some failed, but many succeeded and within a few months it became clear that the phenomenon observed by Foucault was indeed real. This, however, did not stop the flow of experiments. As in all physical experiments, once the effect had been recognized as genuine the challenge shifted to improving the accuracy of the measurement. Table 5.1 shows that in the course of three decades the accuracy was improved by a factor of 10. This quest of ever greater accuracy is not restricted to only a few famed experiments, it really concerns all experiments even the most unpretentious. As an illustration one can mention the fact that the boiling temperature of propanol was measured no less than 140 times; the first result, published in 1864, gave $t_b = 90 \pm 4$ Celsius degrees, while the most recent was published in 1997 and gave: $t_b = 97 \pm 0.2$ Celsius degrees; in other words, over these 133 years the accuracy was improved by a factor of 20¹.

Another point of interest is the fact that all the pendulums mentioned in Table 5.1 were in fact different. They differed by their mass, their length and by many other characteristics which are not mentioned in the table. For instance, experiment 1-3 used a steel wire suspension. In experiment number 6 Phillips first tried an untwisted silk suspension which had to be abandoned because it lead to growing ellipticity (see below); Phillips then shifted to a catgut suspension² which proved much more satisfactory.

In conclusion, it must be emphasized that the replication procedure is by no means merely a repetition but is a creative process. It identifies the parameters that are essential and it covers a broad range of experimental conditions which were not con-

¹All these measurement data along with the references of the corresponding papers are available on line at <http://webbook.nist.gov>.

²Catgut is a strong cord made from the dried intestines of sheep; it is used in particular for the strings of musical instruments.

sidered in the first experiment. For instance, one may wonder if the effect is modified when the initial conditions are changed. The physicists in experiment number 4 found a difference of 13% depending on whether the initial plane of oscillation was in North-South or East-West direction. Subsequently, however, this observation was dismissed.

There is a point which deserves particular attention in connection with the social sciences. In a general way, most physical observations involve more than one phenomenon. The Foucault pendulum is no exception. In fact the effect due to the rotation of the earth is in competition with another phenomenon called the Puiseux effect³. The Puiseux effect says that when the trajectory of a pendulum can be approximated by an ellipse, the major axis of the ellipse rotates with an angular velocity given by the formula: $\omega_P = (3\sqrt{g}/(8\pi)) (S/L^{5/2})$, where S is the area of the ellipse, L the length of the pendulum, g the acceleration of gravity. This effect has no connection whatsoever with the rotation of the earth. Taking it into account, one finds that at the latitude of Paris, with $L = 67$ meters, and with a major semi-axis $a = 3$ meters. the angular velocity of the plane of oscillation ω is given (in 10^{-5}) radians by the expression: $\omega = 5.5 \pm 0.2b$ where b is the minor semi-axis of the ellipse expressed in centimeters. Thus, as soon as $b > 5$ cm the effect due to the rotation of the earth is substantially altered and when $b > 27$ cm one may observe a rotation of the plane of oscillation which is counter-clockwise instead of being clockwise. Many causes such as asymmetries of the pendulum, vibrations of the point of suspension, draft and air turbulence, contribute to increase b which is what makes the experiment fairly tricky. For Foucault and his followers the challenge was to isolate the effect due to the earth. Similarly in the social sciences the real challenge is often to isolate the phenomenon that one wishes to study from other competing effects.

³Victor Puiseux, French mathematician and physicists, 1820-1883.

2 The replication process for cold nuclear fusion

For over 50 years, physicists have been trying to realize controlled fusion. In contrast to nuclear fission in which one big nucleus is broken into smaller parts in a reaction which releases energy, in fusion two small nuclei merge thereby releasing a huge amount of energy. One possible reaction is: $D + D \longrightarrow He + 24 \text{ Mev}$ where D represents a kernel of deuterium composed of one proton and one neutron and He is a nucleus of Helium which has two neutrons and two protons. So far, most attempts have tried to realize hot fusion in which temperature reaches several million degrees. In March 1989, two chemists of the University of Utah and Southampton held a press conference where they reported that an electrolysis of heavy water had lead to a production of excess heat that could only be explained by a process of nuclear fusion. Naturally, the announcement arouse considerable interest. However, from the very beginning it was obvious that the reaction (if any) occurred only under special circumstances. Indeed, the electrolysis was kept functioning for several weeks and most of the time nothing noticeable was to be observed. It was only very occasionally that the temperature suddenly rose to about 50 degree Celsius remaining at that level during a couple of days.

Immediately after the announcement, teams of scientists around the world started work to replicate the experiment. For the next 6 weeks claims and counterclaims kept the topic on the front pages of the newspapers. By the end of May, as there was a growing body of failed replications the initial enthusiasm began to fade in the physics community. The title of an article which appeared on the first page of the New York Times on May 30 gives an indication of the climate at that time: "At conference on cold fusion, the verdict is negative". As of 2005, that is to say 16 years later, the situation is very much the same as it was by the end of 1989: cold fusion remains elusive but there is still no satisfactory explanation for the bursts of heat that have been observed episodically. Physicists and chemists in several countries continue

the research and meet at the annual International Conference on Cold Fusion. On December 2, 2004 the U.S. Department of Energy published a report which says that evidence on cold fusion remains inconclusive⁴.

Because of its negative outcome this episode seems at first sight to greatly differ from the previous one. However, if one discards the question of the outcome the patterns of the two replication process appear to be very similar. In both cases (i) there was great initial excitement among physicists, (ii) the first experiments brought mixed results (iii) the question was basically settled within a few months. (iv) Research on the topic continued albeit at a slower pace during the following decades. This second episode has also a number of specific features which deserve to be mentioned.

- Whereas the Foucault experiment was consistent with theory, cold fusion, in contrast, was at variance with theory. Nevertheless, researchers preferred to trust new experimental results. This reaction is based on the conviction that no matter how well established a theory may be, some unknown physical phenomena may be observed which will upset that theory.

- When the first duplication attempts failed the first reaction of the researchers was to think that some necessary details had been omitted in the published paper. In other words, the researchers suspected that their failed experiments were not really replications but different experiments. It is not impossible that there was indeed a hidden factor which had escaped the attention of the “discoverers” themselves. Even small details can be of crucial importance.

- The fact that despite a steady stream of negative results this topic continues to attract the attention of scientists attests the persistence and patience of physicists and chemists. The situation is very different in the social sciences where even promising fields are abandoned in favor of newer, possibly more fashionable topics. How can one explain such different attitudes? The feeling shared by most physicists that perseverance is essential and in the long-run rewarding is certainly a key factor. Per-

⁴New cold fusion claims were made in March 2004 which were based on compression induced by ultrasonic vibrations. The technique is called sonofusion.

severance is needed to gain a thorough understanding. Even if initially confined to a rather narrow topic, this understanding usually brings about broader progress. Wien's law initially had a rather limited scope but eventually it opened the way to the development of quantum physics. On the contrary, any wrong yet unquestioned observation has the opposite effect: instead of opening new horizons it generates confusion and false starts. This is why it is essential, especially in the context of the social sciences, to weed out misrepresentations and faulty data.

The next two sections provide two examples of situations where faulty evidence can mislead researchers.

3 Biased suicide statistics

In this section we examine suicide rates in New York State and New York City in the 1980s. There are several possible sources: (i) the New York City Department of Health, (ii) the Center for Disease Control (CDC) (iii) the yearly volumes of the *Statistical Abstract of the United States*. One would expect the data given by these sources to be in agreement. As shown in Fig. 5.2 there are substantial differences: 17% in 1984, 29% in 1985, 26% in 1986. This raises two questions.

- Which one of the series is correct?
- How can one explain the discrepancies?

The first clue came from the observation that for three of the boroughs which compose New York City there are huge differences between the statistics of the New York City Dept of Health and the statistics provided by the CDC. As shown in Table 5.2 the differences are of the order of 100%. When one remembers that taken together these counties have a population which represents 28% of the population of New York State, it becomes clear that these discrepancies can explain the differences observed in Fig. 5.2. This represents a first progress in the sense that we have been able to narrow down the question to 3 counties instead of the 62 which compose New

York State. But we still do not know the reasons of the differences.

A further clue is provided by Fig. 5.3. In the International Classification of Causes of Death (ICD-9) suicide corresponds to the code numbers 950-959. Each of the intermediate numbers corresponds to a specific cause of suicide such as hanging, poisoning, fire arms, etc. The broken line corresponds to the code number 799.9 or in words “Other unknown and unspecified causes”. Usually, this is a category which is not of much interest. Yet, Fig. 5.3 shows that there is a clear negative correlation between 950-959 and 799.9 (the coefficient of correlation is -0.68). Now we begin to understand what happened. All suicide deaths require medical determination which, quite understandably, may take some time especially if detailed laboratory tests are required. In the meanwhile the deaths are registered as pending cases in the category 799.9. If for some reason, for instance a lack of qualified personnel, the determination process takes an unusually long time, it may happen that the provisional suicide numbers (not including the cases left in 799.9) are communicated to the CDC where they are put in the database. Once the new, revised suicide numbers become available at the level of the New York City Dept of Health these new figures must also be entered into the CDC database in replacement of the old ones. For some reason, in the present case this was not done. Even more surprising is the fact that these faulty data also occur in the *Statistical Abstract of the United States*.

What conclusions can we draw from this case-study? It calls for increased vigilance in the handling of data. It would be a waste of time to attempt to interpret the huge trough displayed by CDC data for New York State (Fig. 5.4); as we have seen this trough is completely spurious. American statistics are probably the best in the world in terms of comprehensiveness and convenience of use. Yet, in this case there has been a glitch. How can one check suicide data? As seen above a negative correlation between suicide and a vague “catch-all” category such as 799.9 should raise suspicion. Unfortunately, 799.9 is not the only category which may possibly contain ill-defined causes of death. Table 5.4 summarizes the situation in the old and in the

new classification. In this respect it should be noted that even in recent years the death count of R99 showed huge fluctuations in the Bronx county: 1999: 39, 2000: 123, 2001: 23, 2002: 50 (CDC-Wonder). As these numbers are of the same order of magnitude as the numbers of suicides or the numbers of murders this raises some doubts about the reliability of suicide and/or murder data.

4 Interactions between Japanese population and occupation forces

Before presenting some evidence about the occupation of Japan, we describe the context.

4.1 Context

The occupation of a country by a foreign army is a phenomenon which has occurred repeatedly in the course of history. Examples abound: occupation of Belgium and the Netherlands by the 20,000 troops of the duke of Alva in 1567, occupation of Algeria by France in 1830, partial occupation of France by the troops of Austria-Bavaria and Prussia in 1870-1871, occupation of Egypt by England in 1882, occupation of the Philippines by the United States in 1898, occupation of the Ruhr by Allied troops in the wake of World War I, occupation of Germany and Japan by Allied troops in the wake of World War II. Some comparative data such as the numbers of troops of the occupation army and the numbers of fatalities suffered during the occupation can be found in Roehner (2004, p. 286-287). Occupation episodes provide an ideal testing ground for social cohesion.

Such episodes share many common mechanisms and features.

- The occupation troops are a foreign body in the sense that they are not subject to the laws and tribunals of the country. Soldiers and officers who commit crimes against the population are tried by courts martial. Even when severe sentences are meted out, the offenders are often reprieved and pardoned by their commander-in-chief. As a result occupation troops develop a feeling of impunity.

- Occupation troops have to be lodged, fed, heated and entertained. In a country which has been heavily bombed like Germany or Japan in 1945 the requisition of the remaining buildings for the housing of headquarters, officers and troops puts the population in a difficult situation. Moreover, the requisition of coal and oil leads to great hardships in winter time. Under the heading of entertainment one must also include prostitution and semi-prostitution. By definition an army is composed of young males whose needs in this respect cannot be completely ignored. Overt prostitution can be organized by setting up “entertainment inns” reserved to occupation troops. Semi-prostitution hinges on food, money and other favors that women can obtain from soldiers or officers. Needless to say, such relations are a source of friction between troops and the male population.

- Another cause of friction is the question of reparations. In Germany and Japan it took the form of the dismantling of factories and their appropriation by the nations participating in the occupation.

- The trial of political leaders and officers, the former for having started the war, the latter for being responsible of war crimes, was carried out for the first time after World War II. After World War I, there was much talk, especially in the United States, about trying former emperor Wilhelm II. Eventually, however, the plan was dropped when it became clear that the Netherlands would not extradite him. As a result of the trials that took place in occupied Germany and Japan, about 500 Germans and 920 Japanese were executed (Quid 1997, p. 1088, Dower 1999). It seems clear that, no matter how justified they may have been, these trials antagonized former military personnel. In the case of Germany we know that this resulted in a number of bombing attacks against denazification tribunals.

Almost all occupation episodes reveal incidents and clashes between occupation troops and population. This is hardly surprising on the account of the causes of friction listed above. Yet, there is one conspicuous exception, namely the occupation

of Japan. Writing in 1955 in the Swiss newspaper *La Gazette de Lausanne* (November 4) the renowned journalist Tibor Mende notes that there was *not a single* serious incident between Japanese and Allied troops during the whole occupation period. Similar statements can also be read in more recent publications written by historians such as Manchester (1978), Finn (1992) or Dower (1999). In the light of what we said earlier in this chapter about the process of replication, this exception poses a serious problem. In so far as this exception concerns a major country and an important historical episode it cannot be easily dismissed. This conundrum can be solved in two ways:

- One can try to identify factors which may explain why Japan should be an exception.

- One can try to question the data on which the present opinion is based. Is the historiographical record of this period really convincing or are there omissions?

In many ways Japan is a very special country. Thus, if one favors the first explanation there are countless factors which can be invoked. One factor which is frequently mentioned is the role of emperor Hiro-Hito. He asked all Japanese to collaborate with the Allies and therefore, it is argued, Japanese people had no other choice than to comply. From a historical perspective this story is not really convincing for Hiro-Hito was not the semi-God which is described in some historical accounts. Furthermore, on numerous occasions his explicit will was opposed by various groups of Japanese. Let us briefly recall these two points (Behr 1989).

- It is often written that before 1945 the Japanese had never been able to see their emperor. This is not true. In November 1928, Hiro-Hito traveled by train from Tokyo to Kyoto where his marriage was to take place. The journey took two days because of frequent halts which gave Hiro-Hito the opportunity to greet the thousands of Japanese massed along the railroad. In fact, Hiro-Hito attended military parades and official dinners⁵ just like any other head of state.

⁵For instance, on 18 June 1941, he attended a dinner in honor of Wang-Ching-Wei the puppet Prime minister who ruled the northern part of China then occupied by Japan.

- In Japan, emperors have little say in political matters. Emperor Taisho (1912-1926) was a great admirer of Germany; yet, Japan declared war on Germany in World War I. Emperor Hiro-Hito was fond of England which he visited in his 20s; he kept close personal contacts with the royal family; this did not prevent Japan from declaring war on Britain.

- During a failed insurrection in February 1923, the insurgents killed Hiro-Hito's former personal chamberlain. On 14 November 1930, the Prime minister was assassinated, on 7 February 1932 the minister of Defense was murdered, on 15 May 1932 the Prime minister Inukai was killed. On several occasions, Hiro-Hito had condemned these plots and it is therefore hard to imagine that the insurgents could convince themselves that their murders fulfilled the will of the emperor.

Of course, this short discussion does not disprove the first explanation. In fact, Japan has so many idiosyncrasies that it is an impossible task to refute this argument. Moving now to the second explanation, we face a difficult task for, as we will see, most sources which would tell us what happened are not yet accessible (Table 5.5).

4.2 Evidence

On 16 September 1945, that is to say a few days after the beginning of the occupation, General MacArthur imposed a severe censorship. It was maintained at least until the beginning of the Korean War in June 1950 as illustrated by the following news published in the fall of 1949 in the New York Times: (i) "A publisher, S. Morioka, and a professor, I. Oyama, are charged with violations of censorship policies" (9 September p. 12, 29 September p. 15) "A ten-year prison sentence and a fine of \$10,000 [about 70,000 dollars of 2000] were imposed today upon Mrs. Iva Ikuko Toguri D'Aquino, "Tokyo Rose," who was found guilty last week of broadcasting treasonable statements to American troops from Radio Tokyo. " (7 October p. 1)

For this reason the news published in Japanese or foreign newspapers cannot give anything but a fairly incomplete picture; to get a more accurate one we need other

sources. Table 5.4 lists several official sources which, if available, would be able to give qualitative as well as quantitative information. The Provost courts were set up in early 1946 on the model of military courts martial of which they follow the principles of law and rules of procedure. A statement made one year later on March 25, 1947 by the Headquarters of the Eighth Army in Yokohama informs us that during the year March 1946 - March 1947 more than 12,000 Japanese people were tried by United States Provost Courts (i.e. on average 1,000 per month) for crimes committed against Allied troops and property or for violations of censorship regulations. On average 90 percent of those tried were convicted and the average term was 6 months. The sentences that could be inflicted by provost courts were limited to 10 years hard labor. Longer terms or death sentences could be inflicted by Military Commission courts. Unfortunately, it was not yet possible to find statistical data about the number of trials before these courts⁶.

The number of fatalities among occupation troops provides a useful estimate of the intensity of the incidents which oppose them to the population. For the purpose of establishing comparisons between different cases it is best to express fatality numbers in normalized form. The number of deaths per month and per 10,000 troops is a convenient normalized variable⁷. For the sake of brevity we will refer to it as the normalized fatality rate (NFR). What is the range of variation of this rate? This is a question which one needs to address because in any army there are fatalities due to illness or accidents. According to British defense statistics (National Statistics of the United Kingdom 2005, p. 20) in time of peace for a force which is stationed at home or in friendly foreign territory, the normalized fatality rate is 0.70 per month and 10,000 troops. At the high end of the spectrum, one can mention the rate of $25 / (\text{month} \times 10^4)$ for American troops in Vietnam in 1968; such a rate characterizes a situation which is intermediary between occupation and open warfare.

⁶Military Commission courts also tried war crimes; almost all the information which is available about the activity of these courts refers to war crimes.

⁷10,000 is approximately the strength of a division; in fact, depending on circumstances the strength of a division can be somewhere between 8,000 and 18,000; usually the strength is reduced in peace time.

British Commonwealth occupation troops who died in Japan were buried at the Yokohama War Cemetery⁸. The annual numbers of fatalities are represented in Fig. 5.5. It can be seen that during the whole period the normalized rate is above the threshold of $0.70/(\text{month} \times 10^4)$; in 1948-1949, that is to say before the outbreak of the Korean War, it is on average equal to 2.2. On the contrary, the caskets of American troops who died in Japan were shipped back either to the Philippines, to Hawaii or to cemeteries in the continental part of the United States. The National Personnel Records Center - Military Personnel Records (NPRC - MPR), located in the St. Louis suburb of Overland, Missouri holds military records of deceased military but these archives are not accessible to historians. This is why we do not yet know the number of American servicemen who died in Japan during the occupation.

Although numbers matter, they do not tell us much about what really happened. Fig. 5.6a tells us somewhat more. First it confirms what one already observes in Fig. 5.5, namely that the rate of incidents steadily increased between 1948 and 1952. This is also corroborated by the curves in Fig. 5.6b. Secondly, we can observe that the total number of assaults against BCOF personnel is about five times smaller than the number of fatalities (42 against 209 for the same time period 1946-1952). So even if all assaults had been murders (which was certainly not the case) one still has to explain the high number of fatalities. Although, as already mentioned, one cannot count on newspaper articles to give a realistic picture, nonetheless they can provide some hints. Here are some excerpts, mostly from the New York Times.

- There were frequent **fires** in Allied headquarters, barracks or warehouses. In the three months January-March 1947 there were 67 fires in the American zone which puts the annual rate at over 250 fires a year. Below are a few excerpts. (i) “Three officers are killed in a fire at camp Schimmelpfennig (9 January, 1947); the French newspaper *Le Monde* gave the following brief account: “The Japanese once

⁸Except for an undetermined number of dead whose remains were sent back to their home country. For Australian troops this number was of the order of 60. I am grateful for this information to Mr. Ron Orwin, secretary of the Executive Council of Australia of the British Commonwealth Occupation Force.

again attempted to set American barracks on fire”. (ii) “A barrack building was burnt down by Japanese arsonists at Yamaguchi in the New Zealand zone of occupation” (4 April 1947, Brocklebank 1997, p. 77). (iii) “A Japanese, Kumano Mitsuji, is arrested by New Zealand troops and tried on charge of arson of occupation forces barracks (iv) “During the night of April 24-25, 1948 three fires occurred in the Headquarters of the British troops in Kure; the first started at 11:40 pm, the second at 1 am, the third at 3 am” (Australian War Memorial Archives, AWM52 18/1/11).

The acknowledgment that the fire was due to arson was extremely rare. Most often fires were attributed to defective wiring even though most fires began during the night that is to say at a moment when all lights and electric equipment were turned off.

- **Sabotage** actions: (i) “Seven civilians were seized for carrying grenades and other arms” (New York Times: 22 Nov. 1945 p. 16). (ii) On 6 April 1946, working under cover of darkness and avoiding detection by hourly military police, saboteurs destroyed thousands of dollars worth of communications and aircraft equipment at Chofu Airfield 24 km west of Tokyo in what is believed the first organized Japanese violence against occupation forces property (New York Times 6 Apr. 1946 p. 4). (iii) On 21 January 1947, a Japanese was arrested in Kyoto on arson charges. He allegedly tried to set fire to a U.S. Army counter-intelligence office at Saga. The Army said the incident was one of the first cases of such action against Allied forces since the beginning of the occupation (New York Times 21 January 1947 p. 12). (iv) On 15 July 1947, a group of 6 Japanese were arrested and tried by a provost court for the possession of dynamite, detonator, and fuse. Other arrests under the same charge took place on 21 June and 6 September 1947” (New Zealand Archives WA-J 76/1). (iv) “On 10 October 1948 a Corsair aircraft of a New Zealand squadron was set ablaze at Bofu airport” (Brocklebank 1997, p. 208).

- **Clashes** between Japanese and Allied troops. (i) “Private R.C. Young who caught Japanese looting a warehouse was bayoneted to death. One of the three Jap-

anese was sentenced to death and hanged on 18 May 1946” (New York Times: 26 Jan. 1946 p. 6, 18 May 1946 p. 4). (ii) During the month of February 1948, the GHQ of the First U.S. Corp lists 15 violences against American troops, four of which involved fire arms (Eichelberger Papers, volume 33, p. 2008)⁹ (iii) “While walking near the Kotobuki bridge, two Australian soldiers were assaulted by some 30 Japanese; they had to be sent for medical treatment” (16 Aug. 1948 AWM52 18/1/11). (iv) “A mob attacked occupation cars; a GI was hurt” (New York Times: 10 Jul. 1949 p. 22).

- **Damages suffered by Japanese people.** Although there were some criminal cases¹⁰ most of the damages suffered by Japanese were probably due to reckless behavior. This statement can be illustrated by two kinds of incidents. (i) In 1945 and 1946 the Japanese people faced very difficult conditions including semi-famine; a number of them were killed when caught trying to break into Allied warehouses. The following story is typical of this sort of incidents. “A GI shot and killed a Japanese at Matsuyama (south of Hiroshima). The dead was part of about 1,000 civilians who stormed a bivouac area which was being vacated to pick over the left-behind trash. One guard fired into the ground several times and when that had no effect, he fired into the mob” (Pacific Stars and Stripes: 24 Dec. 1945, p. 1). (ii) Another illustration was the frequency of traffic accidents. In an official Australian account we read that in 1948 about 45 Japanese were killed as a result of traffic accidents involving BCOF vehicles (AWM52 18/1/11) In proportion to the small number of vehicles of the BCOF force this is a very high figure. Indeed, in 1948 the BCOF was reduced to the Australian contingent and this force comprised less than 10,000 troops. For a country of 100 million adults like Japan such a rate would

⁹The Eighth Army which occupied Japan was composed of the First, Ninth and Tenth Corps; if one admits a strength of 35,000 for the First Corps the 15 assaults per month correspond to a rate of $4.3/\text{month} \times 10^4$.

¹⁰e.g.: “Private Stratman Armistead, 32, was sentenced to be hanged for having murdered 4 Japanese with a hammer. The sentence is subject to review by Lieutenant General Eichelberger, commander of the Eighth Army” (New York Times: 16 April 1948, p. 7).

imply 450,000 pedestrians killed in vehicles accidents every year. From a document published in a book by Shunsuki Tsurumi (1961) one learns that 4,339 Japanese households obtained indemnities from the Japanese government for deaths suffered as a result of the occupation. Unfortunately, we do not know the causes of these deaths, but it is reasonable to think that a part of them were due to traffic accidents. If the rate of 45 per year for the Australian force is extended to the total occupation force and to the whole duration of the occupation, one gets a figure of $45 \times 10 \times 5 = 2250$. If this estimate is correct, it means that about one half of the 4,339 deaths should be attributed to traffic accidents.

Together with the previous graphs this enumeration shows that the view of the occupation presented by Tibor Mende and which still prevails nowadays is fairly inadequate. It also suggests that the incidents that we mentioned are only the tip of the iceberg¹¹. Once the archives will be opened to historians we will be able to see this episode in a perspective in which it will no longer appear as a disconcerting exception.

5 Conclusions and perspectives

Adopting the replication procedure as a standard requirement in the social sciences would truly represent a watershed for it would lead to a number of robust regularities which would give the field firm foundations. But replication goes even further than that. In the course of time as the accuracy of measurements is progressively increased there comes a moment when our understanding becomes inadequate. A classic example is the fact that the orbit of the planet Mercury could be explained by Newtonian mechanics until more accurate measurements made clear that another effect was at work. This kind of remark may seem easy to make with the benefit of hindsight. Here is a more speculative illustration. The best accuracy achieved in the

¹¹A fairly detailed chronology of all the incidents mentioned in the sources which are available so far can be found on the author's website: <http://www.lpthe.jussieu.fr/roehner>.

experiment of the Foucault pendulum remains fairly low; is it possible to imagine a Foucault pendulum whose precision would be 10^{-5} % or 10^{-6} %? There seems to be little hope to achieve such an accuracy with a pendulum because there are too many sources of noise but there can be other devices based on the same principle e.g. a vibrating rod whose extremity is clamped in a chuck or perhaps vibrating (non colliding) molecules. Assuming that a higher accuracy can indeed be achieved what could we learn from such an experiment? The Foucault pendulum is said to oscillate in a plane which is fixed relative to “the distant stars”. Obviously, this is a fairly vague statement. Do these distant stars refer to stars which are in the vicinity of the earth, or to stars in distant galaxies? A high accuracy Foucault “pendulum” would provide experimental answers to such questions. The following table lists movements of the earth which may become observable with such a device.

Rotation	Period [day]	Angular velocity [degree/24 h]	Precision required [%]
1 Rotation of the Earth on its axis	1	360	
2 Rotation of the Earth around the Sun	365	0.986	0.20
3 Precession of the equinoxes		$1.4 \cdot 10^{-3}$	$4 \cdot 10^{-4}$
4 Rotation of the solar system around the center of the galaxy	$73 \cdot 10^9$	$1.3 \cdot 10^{-11}$	$4 \cdot 10^{-12}$

Notes: The angular velocity column gives the angular deviation in 24 hours of the plane of a Foucault pendulum located at the North pole as observed by a terrestrial observer. The last column gives the precision with which one must measure the deviation in order to be able to detect the rotation mentioned in the same line of the table. The accuracy of standard Foucault pendulum experiments is comprised between 0.5% and 1% and is therefore too low for the effects number 2, 3 and 4 to be observable. The so-called precession of the equinoxes is a slow change in the direction of the axis of rotation of the Earth, an effect which is similar to the phenomenon by which the axis of a spinning top “wobbles” when a torque is applied to it. In addition of the movements listed in the table our galaxy is also moving toward the Andromeda galaxy with a relative velocity equal to 220 km/s (which is about 7 times more than the speed of the Earth on its orbit around the Sun). However, at time of writing, it is not clear if this movement is also a rotation around some (still unknown) center.

In this chapter we did not discuss cases in which the data are purposely distorted or twisted. This kind of distortion is uncommon in physics but fairly common in human societies. This is why we devote a separate chapter to this problem. Needless to say, in time of war, the extent to which news are corrupted by deception becomes much greater. This effect is well documented in Knightley (2004). In the preface of

a book about the occupation of Germany one finds the following sentence: “German witnesses who demonstrated a historical perspective by seeing the good side of the victors and the bad side of the losers have been accepted as the more credible” (Peter 1990). Statements as explicit as this one are rare especially in books published 40 years after the end of the war. Yet, the example of the occupation of Japan shows that it is probably easier to follow mainstream views than to question them.

Table 5.1 Replication of the Foucault pendulum experiment

	Month	Year	Location	Physicist	Length [m]	Mass [kg]	Accuracy %
1	Jan	1851	Paris	Foucault	2	5	
2	3 Feb	1851	Paris	Foucault	11	5	
3	31 Mar	1851	Paris	Foucault	67	28	7
4	Spring	1851	Paris	Dufour	20	12	7
5	May	1851	Bristol, UK	Bunt	16	24	3
6	Jun	1851	York, UK	Phillips	16		1
7	Oct	1851	Rio, Brazil	D'Oliveira	4	10	87
8		1879	Groningen	Onnes	1	5	0.5
9		1937	Benares, India	Dasannacharya	1		1.3

Notes: The table presents only a select sample of the experiments which were performed. In 1851 alone the experiment was performed in a dozen European cities (Barsics 1993, p. 3). With the exception of experiment 7 there was a steady improvement in the accuracy of the measurement. Some of the accounts contain perplexing statements; for instance D'Oliveira claims that he has found a direction of oscillation in the South-West sector for which the plane of oscillation remains invariant.

Sources: 1: Foucault (1851); 2: Barsics et al. (1993); 3: Foucault (1878), 4: Dufour et al. (1851); 5: Bunt (1851); 6: Phillips (1851); 7: D'Oliveira (1851); 8: Onnes (1879), Schulz-Dubois (1970); Dasannacharya et al. (1937)

Table 5.2 Number of suicides in the boroughs of Brooklyn, Bronx and Manhattan

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Brooklyn									
NYC DH	149	137	141	142	111	134	107	127	124
CDC	156	145	140	139	91	47	33	56	73
Bronx									
NYC DH	107	97	68	87	80	82	96	67	90
CDC	112	102	44	35	34	29	30	14	22
Manhattan									
NYC DH	213	175	184	154	171	140	161	136	146
CDC	234	201	133	68	77	54	46	32	44

Notes: The table compares the number of suicides given by two different sources: NYC DH = New York City Department of Health, CDC=Center for Disease Control. The borough of Brooklyn coincides with the county of Kings and the borough of Manhattan coincides with the county of New York. The trough (centered on 1985) displayed by the CDC data are a spurious effect which is explained in the text.

Sources: New York City Department of Health, CDC-Wonder data base. I am grateful to Dr. Wen Hui Li, Director at the New York City Department of Health and Mental Hygiene for the data and additional explanations.

Table 5.3 Classifications of causes of death

Classification	Unknown or unspecified cause of death	Suicide	Undermined intent even after investigation
ICD-9	799.9	950-959	980-989
ICD-10	R99	X60-X84	Y10-Y34

Notes: ICD-9 and ICD-10 are the former (until 1998) and present International Classifications of Causes of Death. At the New York Department of Health the codes 799.9 and R99 were used to momentarily shelf cases which were pending for investigation. The codes 980-989 (or Y10-Y34) are other categories in which pending cases can be stored. Any substantial increase in these “catch-all” categories may signal anomalies in the data collecting procedure and raise suspicion about data in categories such as “suicide” or “death through assault” (i.e. murder).

Table 5.4 Availability of historical records about the occupation of Japan

Type of data	U.S.	U.K.	Australia	New Zealand
Roll of Honor	NA	A	A	A
Provost court trials				
• Statistics	~ 10%		NA	A
• Records	~ 3%		NA	NA
Military Commission trials				
• Statistics	NA	NA	NA	NA
• Records	NA	NA	NA	NA
Court martial trials				
• Statistics			NA	
• Records			NA	
Claims for indemnities by Japanese				
• Records	NA	NA	NA	NA
Investigation reports on fires				
• Records	NA	NA	NA	NA

Notes: The term “Statistics” means number of cases per month whereas the term “Records” means detailed accounts of the trials or of the claims. NA (i.e. not available) can mean two things (i) the archivists who are in charge of such material do not know where it is located (ii) the material is well located but the archives are not open to historians. When a percentage figure is given it means that only a fraction of the data are available. To the occupying powers mentioned in the table one should also add the Soviet Union who occupied the South of Sakhalin and the Kurile Islands (see in this respect Sevela (2001)) and Indian forces who took part in the occupation until July 1947. The “Roll of Honor” is a list of fallen soldiers and officers which comprises the dates and sometimes the causes of the death; for our purpose the names are of course irrelevant. Provost courts and Military Commission courts tried Japanese people who had committed misdemeanors, misdeeds or crimes against occupation troops. The difference was in the sentences; provost court sentences were limited to 10 years hard labor, whereas Military Commission courts could inflict heavier sentences including the death penalty. Based on data for the BCOF, the number of courts martial was of the order of 10 per month and per 10,000 troops (Brocklebank 1997). About 10,000 Japanese households obtained indemnities from their government for physical damages suffered as a consequence of the occupation (4,339 cases concerned deaths); these data were published in Tsurumi (1961) but to our best knowledge no detailed study of the circumstances of these casualties have been undertaken. There were about 250 fires a year in Allied installations; detailed investigations were made into their causes but until these reports become available we will ignore which proportion of these fires were arsons.

Source: Personal investigations, Brocklebank (1997), Sevela (2001), Tsurumi (1961).

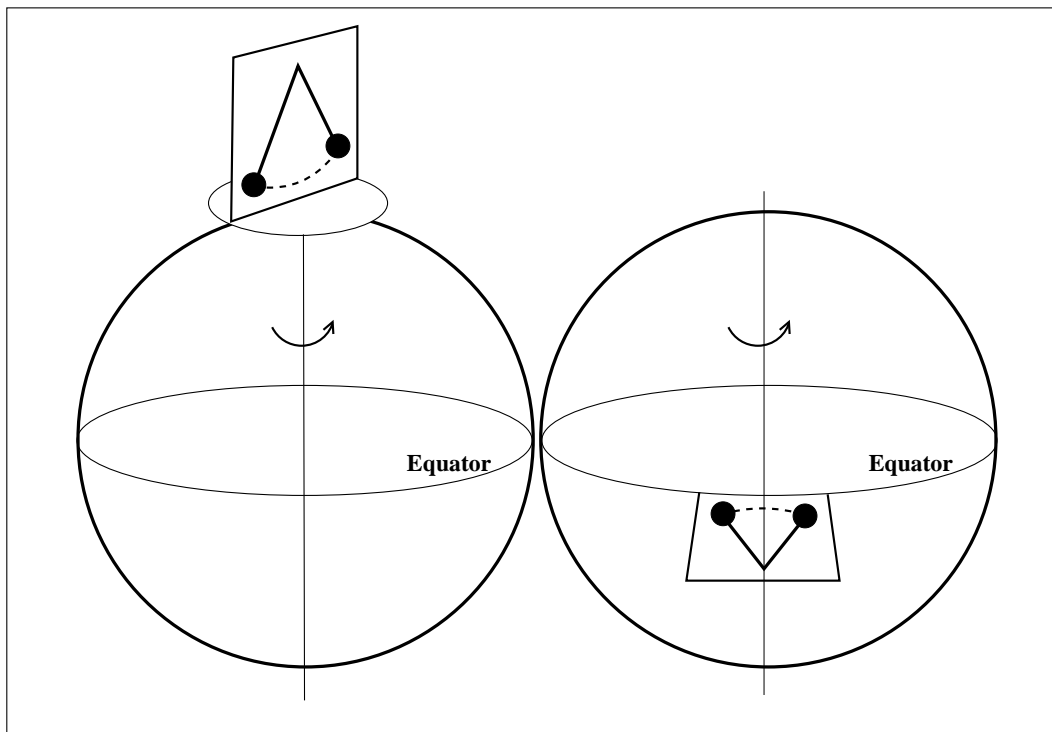


Fig. 5.1 Schematic representations of two extreme locations of the Foucault pendulum. The left and right hand side figures represents a Foucault pendulum at the North Pole and on the equator respectively. Observation shows that in the first case the oscillation plane describes a full circle in 24 hours whereas it remains fixed in the second case. This result is usually described by saying that the plane of oscillation remains pointing in the same direction with respect to the fixed stars. A question of interest is whether the observation would be the same if the earth would be spinning in an empty universe.

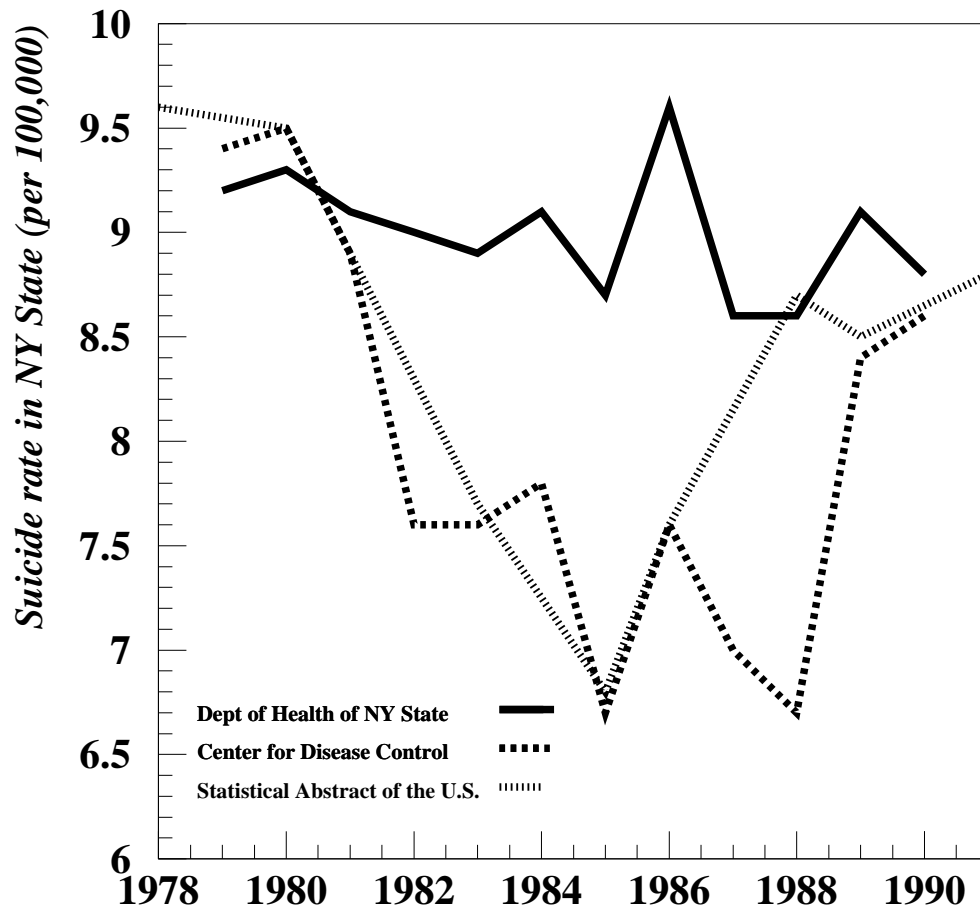


Fig. 5.2 Suicide rates in New York State. The graph shows annual suicide rates in New York State according to three different sources: the Department of Health of New York State, the Center for Disease Control and the Statistical Abstract of the United States. The discrepancy between the first source and the two others reached 29% in 1985. *Sources: New York State Dept of Health, CDC Wonder data base, Statistical Abstract of the United States (various years). Many thanks to Dr. Peter Herzfeld of the New York State Dept of Health for sending me the data for New York State.*

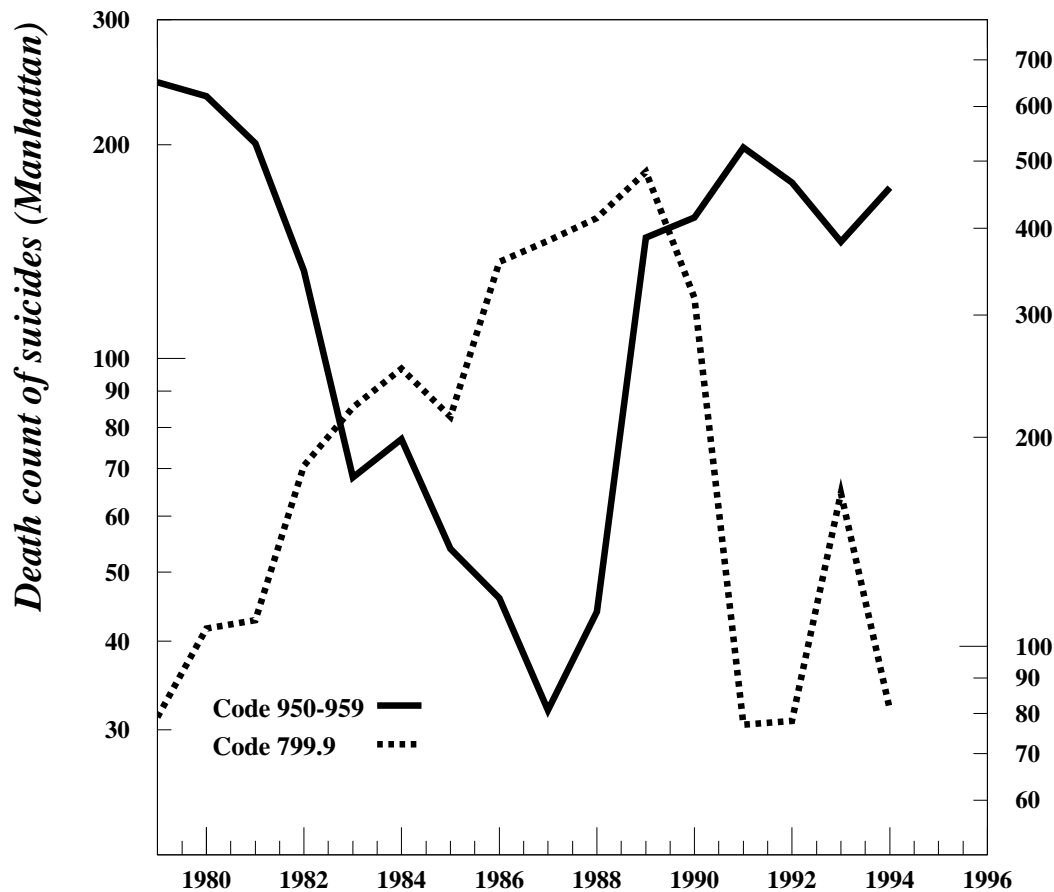


Fig. 5.3 Death counts in Manhattan for two codes of the International Classification of Death. Solid line: death count for code number (ICD-9, 950-959: suicide), scale on left-hand side; broken line: death count for code number (ICD-9, 799.9: other unknown and unspecified causes of death), scale on right-hand side. This category was used by the New York City Dept of Health in order to store pending cases until they had been treated. For some reason, the provisional figures became definitive data at the national level. The correlation between the two series is -0.68 . From the difference in magnitude of the death counts it is clear that, apart from pending suicide cases 799.9 also incorporates other pending causes such as murders or accidental deaths.

Source: CDC-Wonder (<http://wonder.cdc.gov/mortlCD9>).

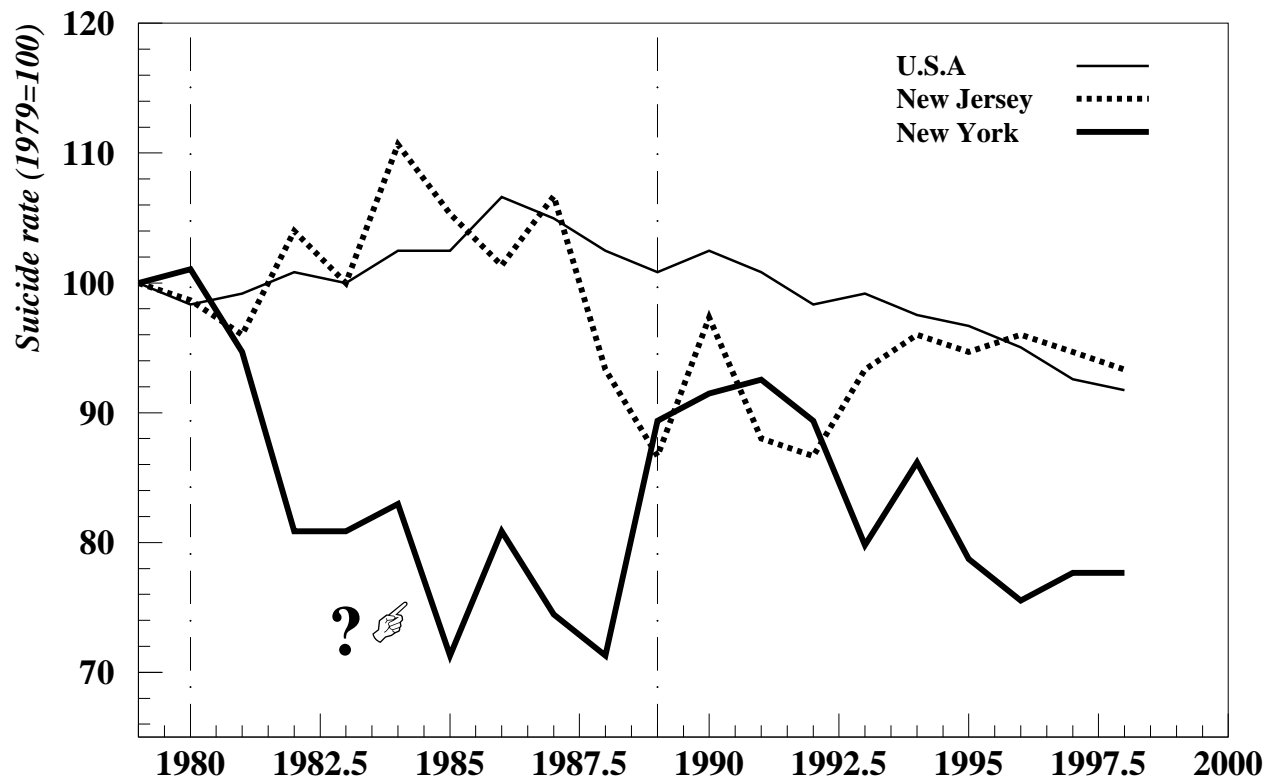


Fig. 5.4 Suicide rate in New York State, New Jersey and the U.S. At first sight one may wonder about what caused the 30% trough in New York State with respect to nearby New Jersey or to the rest of the U.S. As a matter of fact the trough is spurious (see text) and it would be a waste of time to wonder about possible sociological causes. *Source: CDC-Wonder (<http://wonder.cdc.gov/mortlCD9>).*

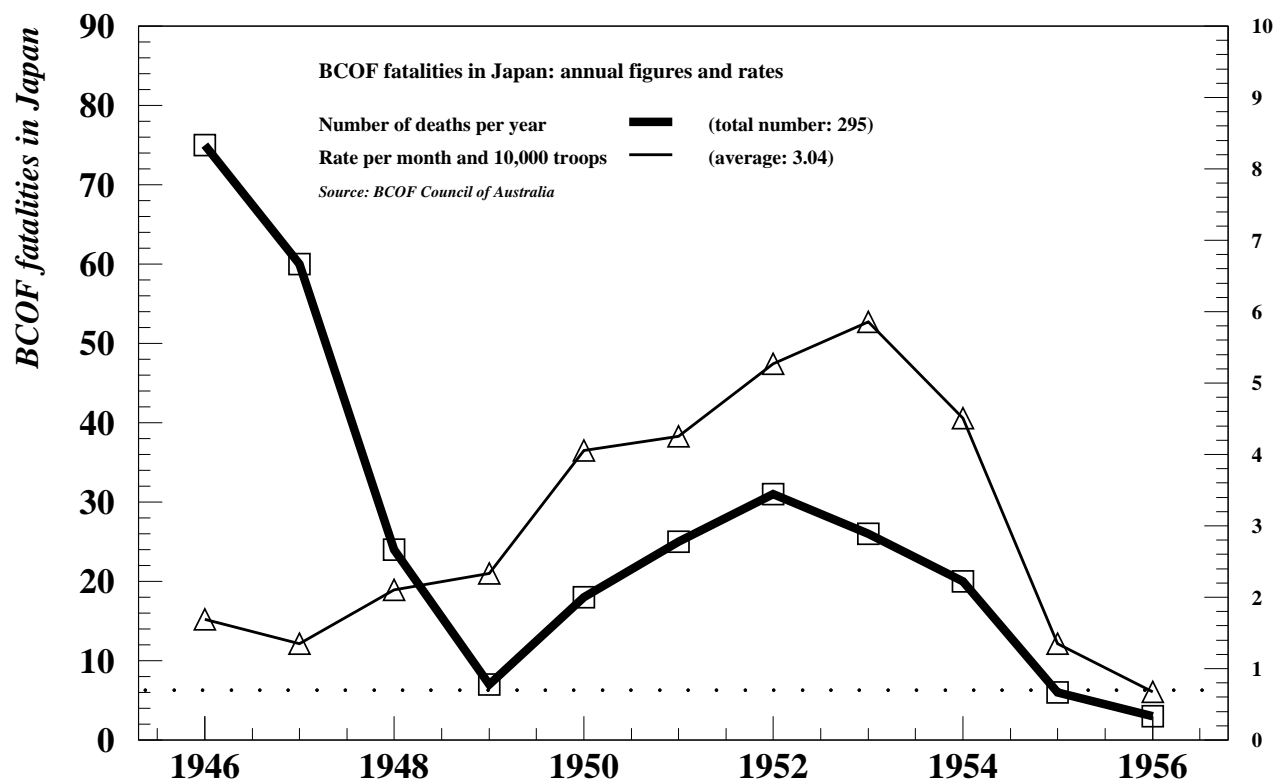


Fig. 5.5 Soldiers, officers and civilians of the British Commonwealth Occupation Force (BCOF) who died in Japan. Solid line: number of members of the BCOF who died in Japan and are buried at the BCOF cemetery in Yokohama; this count underestimates the number of fatalities because the remains of some had been shipped back to their home country; for instance, about 60 Australian servicemen who died in Japan are buried in Australia (for the other BCOF countries, we do not know). Thin line: fatality rate per month and per 10,000 troops. For the purpose of comparison it can be noted that the fatality rate was about $4.5/(\text{month} \times 10^4)$ for the American force occupying Iraq in 2003-2005. After the beginning of the Korean War there were continuous movements of troops between Korea and Japan; as a result the number of Commonwealth troops stationed in Japan was not well defined. *Source: BCOF Council of Australia. Many thanks to Mr. Ron Orwin for his help.*

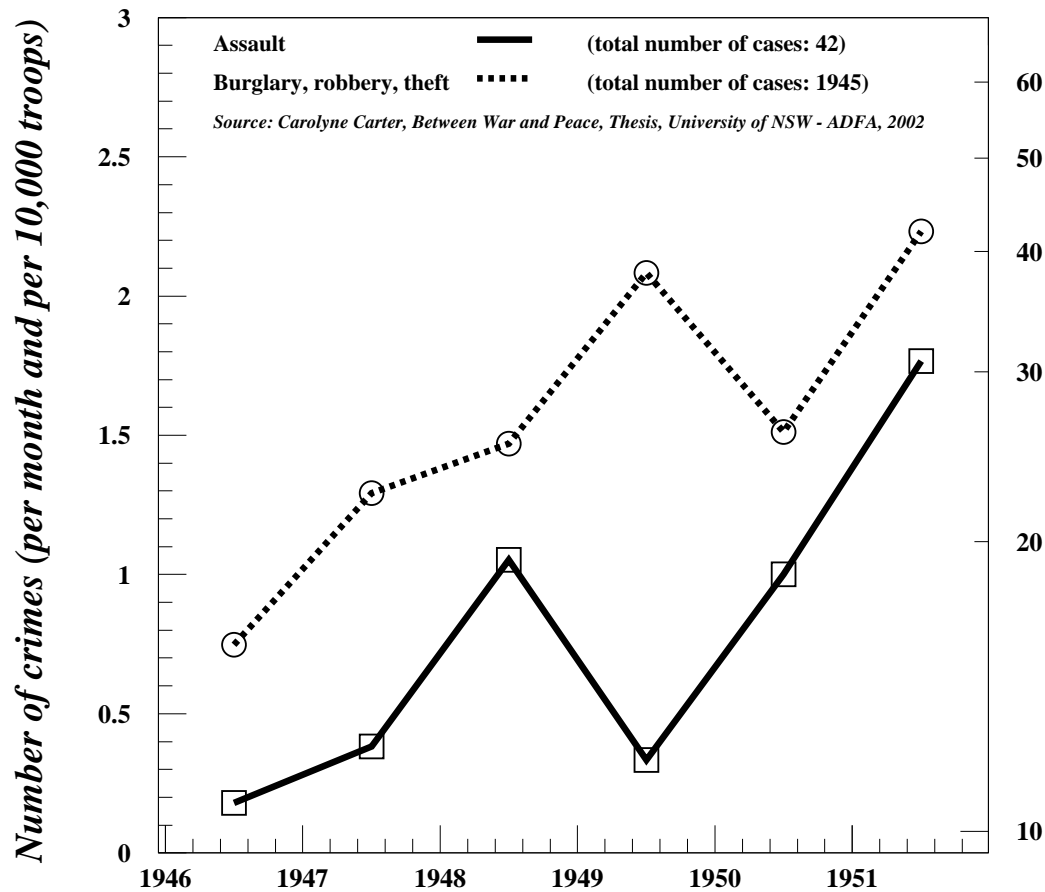


Fig. 5.6 a Clashes between Japanese civilians and BCOF personnel. Burglaries and robberies were due to the great scarcity that existed in Japan in the first post-war years. The main interest of this curve is to provide a consistency check of the curve for the number of assaults of Japanese on BCOF personnel. *Source: Carter (2002, p. 309, thesis submitted to the Australian Defence Academy at the University of New South Wales.*

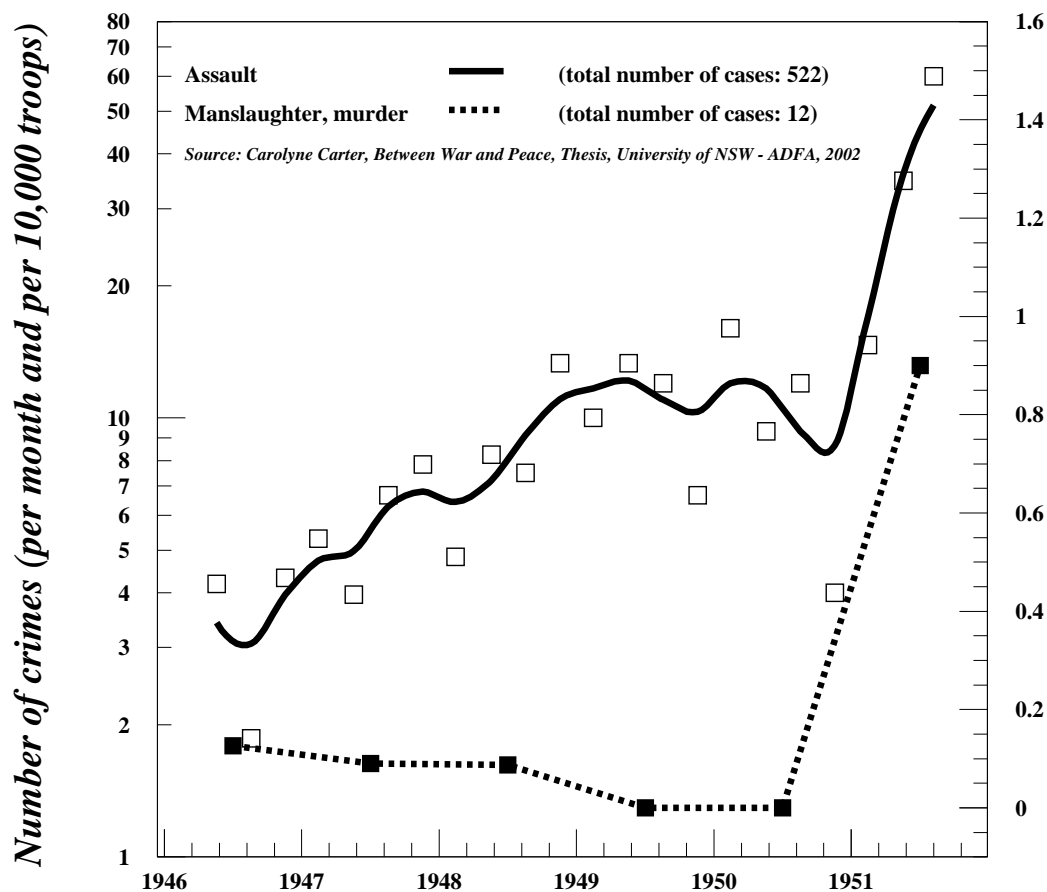


Fig. 5.6 b Crimes committed by BCOF troops against Japanese people. These numbers are based on BCOF statistics. The ratio of the number of assaults of BCOF personnel on Japanese to the number of assaults of Japanese on BCOF forces is $522/42 = 12.4$. Source: Carter (2002, p. 287, 289, thesis submitted to the Australian Defence Academy at the University of New South Wales).