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Contributors

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ON THE
OBJECTIVE STUDY
OF
CROWD BEHAVIOUR

By
L. S. PENROSE



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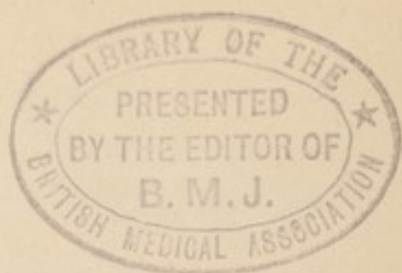
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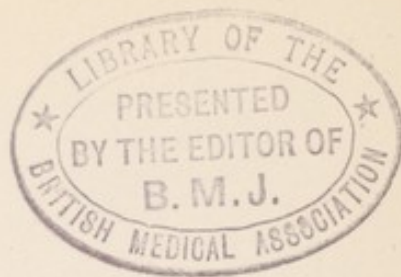
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ON THE OBJECTIVE STUDY
OF
CROWD BEHAVIOUR

OF THE CRIMINAL SYSTEM

IN

ENGLAND

ON THE
OBJECTIVE STUDY
OF
CROWD BEHAVIOUR

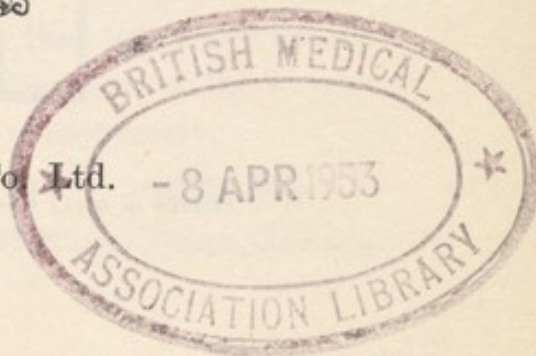
By

L. S. PENROSE
M.A., M.D.

With 2 Figures and 3 Tables



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PREFACE

The methods of studying crowd behaviour to which I have drawn attention in this essay are largely, but by no means entirely, arithmetical. My emphasis on measurement is deliberate because that aspect of the subject has often been neglected with consequent loss of objectivity. The concept of a mental epidemic which I use is not new but I have tried to show how the numerical treatment of the phenomenon may be advantageous.

In discussing the question of voting I have introduced the assumption of indifference which does not correspond closely with the facts as usually understood. However, since the future decisions of an elected representative cannot be easily predicted, voting is actually much more at random than it appears to be to the voter. Thus, the general theorems which can be established by using the assumption may be more often valid than might at first be supposed. To preserve continuity of argument, mathematical proofs of all basic formulae have been omitted.

I would like to take this opportunity of expressing my appreciation of the assistance of various kinds which I have received in preparing the book from N. W. Pirie, C. A. B. Smith, G. Beall, Helen Lang Brown and R. L. W. Collison, none of whom must be held responsible for the assertions it contains. Few people are expected to be in agreement with all my suggestions. I can only hope that the reader will be stimulated to further objective consideration of the important topics with which I have dealt so inadequately.

L. S. PENROSE,

University College, London

May, 1951.

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ON THE OBJECTIVE STUDY OF CROWD BEHAVIOUR

CHAPTER I INTRODUCTION

Studies on the psychology and psychopathology of groups have usually been of two kinds. They may describe the behaviour of groups of people qualitatively and attempt to analyse the structure of the phenomena observed in terms of social or psychological concepts. On the other hand, they can deal with records of sample populations classified numerically by opinions or modes of action occurring within the samples. Among qualitative studies are the classical contributions of le Bon, Trotter, Freud and many others and the ideas expressed on this aspect of crowd psychology have been collated by Reiwald. The numerical approach is a recent development. It often tends to be rather superficial in its aims and is typified by surveys carried out by Gallup, Mass Observation and other metrical analyses of public opinion but it has the advantage of providing objective data. In this type of work, the study of processes underlying the changes of the measurements has often been completely neglected though this deficiency has been remedied to some extent by experimental surveys of opinion changes after exposure of groups to propagandist influences.

In the present communication an attempt is made to formalize some of the concepts used by students of crowd psychology with a view to expanding knowledge of the static and dynamic

mechanisms involved in the spread of ideas in populations. The fundamental unit can be defined as a person characterized by possessing a given idea or potential reaction pattern. Assuming that the number of people with the same idea in a given population can be counted, a metrical effect is obtained. The use of the term 'idea' as a unit of potential reaction is not unreasonable in view of the modern concept of 'gestalt' as a unit in psychology and a complex wave pattern as the physical basis of memory. The theories developing at the present time as a result of experiments of Lashley and others suggest that it may prove to be literally true that two people can have the same idea, i.e. the same wave structure.

The term 'crowd' as opposed to 'herd', 'group' or 'mass' has the support of Greenwood in his treatment of epidemiology of physical diseases. The crowd has the advantage of being an object; the name emphasizes the numerical aspect but it must not be thought necessarily to imply proximity of all members of a group to one another. In the present treatment, an attempt will be made to build on the basis of the simple concept of a number of people who have the same idea. I propose to examine some theoretical consequences of such an assumption and further to collect some observations in numerical terms, such as are in general use in epidemiology, about the spread and decay of ideas in groups and crowds.

Writers on crowd psychology, though they differ greatly among themselves about questions of interpretation of behaviour in terms of instincts, are agreed upon one main principle. The individual acts differently as a member of a group from the way he acts as an individual. He falls into line with the general pattern of group behaviour whether or not this conflicts with the ideas he holds as an individual. For example, in ordinary life, he observes the current rules of etiquette and dress. In the more important cases of large

groups, such as occur in religious and political parties, he may follow a general pattern of behaviour without question. In the extreme case of national groups, there may be gross conflict between his local personal behaviour pattern and that undertaken on behalf of his country. The result is that a large group often appears to have different standards of morality from those of the individuals composing it. On behalf of his side in a game, on behalf of his business organization or on behalf of his national group, the individual's ideas and interests are submerged in those of a crowd. These patterns of group reaction have moral standards, according to some views, higher and, according to others, lower, than those of individuals. On the one hand, ideas connected with self-sacrifice and comradeship are increased in group behaviour and, on the other hand, childish intolerance, avarice, deceit, violence and murder are considered justifiable in the service of national or political interests. Thus McDougall wrote, 'participation in group life degrades the individual, assimilating his mental processes to those of the crowd, whose brutality, inconsistency and unreasoning impulsiveness have been the theme of many writers; yet only by participation in group life does man become fully man, only so does he rise above the level of the savage'.

According to some authorities, the difference between individual and crowd behaviour patterns is due to the stimulation in groups of forces dependent upon a special herd instinct. According to Freud, however, the change is due to the childlike acceptance of different sorts of parental authority in the different circumstances. The leader of the group takes the position of ethical director by a process usually unconscious in both leader and led. The amount of discordance between behaviour of an individual as member of a given group and his behaviour otherwise depends upon

the nature of the group, its isolation or the mode of inter-communication between its members. Also, much depends upon the size of the crowd.

The question of the size of the group, in relation to its susceptibility to influence and the strangeness of its reactions, was emphasized by Ortega y Gasset. This outlook has been criticized by Reiksgaard because it neglects certain fundamental psychological changes in behaviour. Rickman, however, has pointed out that the type of reaction pattern may be a function of the size of the group and gives, as an example, the idea of the Oedipus complex of Freud which is a relation between three people. There are, indeed, many elementary arithmetical facts which it may be worth while to consider without denying the possibility of making more profound observations subsequently.

A very important branch of the study of crowd behaviour concerns crowd mental diseases. Not infrequently, ideas become prevalent in a group which imply disruption of the group itself or destruction of its members. From the point of view of the health of the community such ideas can be classed as diseased or pathological. This criterion of disruptive tendency perhaps cannot be very clearly defined but it makes an attempt at objective valuation of the processes which will be studied in detail. It would be unscientific to assume, say, at the outset that all forms of activity which are based upon the dissemination of illusions or phantasies, for example, politics, national enthusiasms, commercial advertising, art, war and religion, are evidence of crowd sickness in the mental sphere. Some of these widespread systems of ideas may further cohesion of smaller groups although they are, at the same time, possibly disruptive to larger communities of which the small groups form part. An unhealthy mental process may, however, be concealed under

the façade of almost any kind of crowd behaviour. Some crowd mental disturbances are benign and of long duration, like superstitions, the delusions of the efficacy of religious belief or economic theory; others are severe and disruptive but persist for relatively short periods.

A highly characteristic feature of nearly all forms of individual insanity is that the patient is unaware of his sickness; a patient who admits he is not well has taken the first step on the road to recovery. In an analogous way, the recognition of the pathological nature of many aspects of crowd behaviour could prove to be a stabilizing factor in the development of human cooperation. This possibility justifies examining pathological as well as normal crowd behaviour. The somewhat new viewpoint, emphasizing mainly the significance of numbers of people, can be applied to both these aspects of the subject matter.

CHAPTER II

EFFECTS OF SIZE OF THE GROUP

(a) FORMAL CONSEQUENCES

I shall first consider some purely formal consequences of the number of persons comprising a group. These are static rules in that they concern populations wherein the structure is fixed. The reader, I hope, will tolerate the necessary introduction of mathematical notation at some points.

In a small collection of people, a change of opinion among a few of its members may easily alter the attitude of the whole group. In a committee or an electorate, where democratic principles are accepted, the vote of the majority determines the course of action. If most of the members are indifferent or divided in opinion in a random manner, it is comparatively easy for a surprisingly small set of resolute members to control almost every decision. Thus in a group of three, one person who knows his mind will obtain a majority vote in three times out of four provided that the other two members vote at random. About the same degree of control can be exercised by a bloc vote of 3 over an indifferent population of 20. The remarkable fact is that, although the power of an individual or a bloc vote becomes gradually less, as the group becomes larger, this power only decreases as the square root of the number of indifferent voters. Furthermore, the proportion of the electorate needed in the resolute bloc, in order to exercise any given degree of control, decreases with the size of the group; this proportion is, in fact, related inversely to the square root of the number of indifferent voters. For a given degree of

control, the number, n_R , in the bloc, equals $K/\sqrt{n_I}$, where n_I is the number of indifferent voters and K is a constant quantity. When $n_R = 1/\sqrt{n_I}$, the resolute group carries 84.1 per cent. of all decisions. A bloc three times this size ($K=3$), will only be in the minority once in a thousand divisions.

In general, with a large crowd voting at random on one of two alternatives, the power, P , of a bloc of n_R voters may be measured by doubling the proportion of decisions in excess of 50 per cent. which accord with its wishes. Thus, if the bloc only wins 50 per cent. of decisions, its power is zero. If it wins 100 per cent., its power is unity. The formula is :

$$P(n_R) = 2 \int_0^x \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}},$$

where $x = n_R/\sqrt{n_I}$, and the value of the integral can be obtained from ordinary tables of the Gaussian error function. This index, P , only varies between zero and unity. Some examples are shown, in Table 1, of the percentages of decisions controlled by blocs of various sizes in otherwise randomly voting populations. The corresponding values of

Table 1

<i>Number in Indifferent crowd (n_I)</i>	<i>Number in the controlling group of bloc voters (n_R)</i>		
25	5	10	15
100	10	20	30
10,000	100	200	300
1,000,000	1,000	2,000	3,000
100,000,000	10,000	20,000	30,000
2,500,000,000	50,000	100,000	150,000
<i>Percentage of decisions carried by bloc voters</i>	84.1	97.7	99.9
<i>Power of bloc voters $P(n_R)$</i>	0.682	0.954	0.998

P are also given ; these represent the chances of being able to influence a decision in either direction.

The important statistical fact which emerges from these considerations is the very high degree of control exercised by a comparatively small resolute group over an indifferent population of large dimensions. In other words, the same degrees of control are obtained in two populations of different magnitudes by blocs proportional in numbers to the square roots of the respective numbers in the two populations. Thirty people have almost complete control over the voting of 100 and the same is true of a resolute group of 3,000 against one million.

It is obvious that the successful control by a small minority of the results of voting depends upon complete indifference of the remaining members of the electorate. In actual populations there is often a tendency for opinion to be distributed in blocs and it is theoretically possible for the indifferent group itself to be composed of a number of separate blocs. If such blocs were all equal to one another in numbers, the situation would, mathematically, be equivalent to one in which there were a few individuals acting independently each with a large number of votes. A correspondingly larger resolute group would be required to control them. Conversely, the power of an oligarchy may be increased by breaking down units likely to form blocs of opinion irrespective of their natures. Something of this sort was done by the German dictatorship in the liquidation of, or weakening of loyalty in, ideological groups of all kinds, not only religious bodies but also sports clubs.

In this analysis I have only discussed the case of two alternatives on which a decision has to be made. When there are three candidates, for instance, the random chance of picking the one who wins is one in three instead of one in two.

In such circumstances, the power of a bloc vote can be reckoned as one and one half times the amount that the chance of winning is increased above one third. The power of a resolute bloc, thus measured, is increased as the number of alternatives becomes greater though the total percentage of decisions carried by the resolute group is less. On the other hand, the same general principle of the relative power of a bloc vote depending upon the square root of the number of indifferent voters still holds good.

(b) STRATIFIED CONTROL

Stratified or hierarchical systems of control can be used to extend the power of a resolute minority provided that a decision once taken binds all the members of the group who voted upon it. Structures of this nature are found almost universally wherever authority is maintained and they are particularly noticeable in authoritarian organisations; military, religious, political, social and industrial purposes are all served well by stratified control. The efficiency of a central directive group in obtaining the results it desires can be estimated on the basis of the figures in Table 1. A high degree of control is exercised by a bloc of 20 over a population of 100. Further, a bloc of 120 can operate a similar degree of control over 3,600 people. The stratified control of the original 20 over the 3,700, i.e. 3,600 indifferent voters plus 100 'yes' men, is far more efficient than would be an attempt to govern them simply by a resolute bloc of 20.

In general, if P_1 is the power of the central oligarchy over the group next below in the hierarchy and P_2 the power which this lower group would, by themselves, exercise over those on the next level, the power of the original group over this next-but-one population is $P_1 \times P_2$. Although the degree of control available to the central authority would be

diminished at each step, its final effect on the general population would be vastly greater than that which could be obtained by direct means. A central group of 15, for example, would normally have only one chance in one thousand of influencing the decisions of a population of 100 million. But with four intermediate stratified blocs of 25, 69, 529 and 30,000 people respectively the resolute group of 15 would retain control of 99 per cent. of the decisions of 100 million random voters. The familiar arrangement of delegating to several members of a bloc the responsibility of controlling a separate part of the population at the next lower level is less economical but still far more powerful than control in the absence of stratification.

It is to be noted that these somewhat alarming possibilities are dependent upon complete indifference of the masses of voters and, to obtain these results, the population must be kept in ignorance of the issues upon which the vote is being taken. Moreover, it must not be supposed that the object of a small group, which seeks to control the majority decisions of a community, is necessarily selfish or malign in its intentions. On the contrary, the intentions could be benign, to preserve or enhance the physical and mental health of the population or directed towards their economic betterment and general happiness.

(c) THE POWER OF ONE VOTE

While discussing these formal points, it may be useful to give special attention to the case of the single voter. The formula given earlier for the power of n_R voters becomes simpler when n_R is equal to unity. There is one difficulty, in theory, namely that it makes a significant difference whether or not the number of the remaining voters is even or odd. To overcome this, it can be assumed that, when there is a tie

in the voting, this has just half the value in satisfaction as a win by majority. In a committee which has two members, the chairman's casting vote is decisive. His extra vote, if always added, would imply a majority for or against the motion in all circumstances. But, with a committee of three, the extra vote of a chairman, if allowed, would only equalize in certain cases. By allowing these ties to score half as much as wins, the theory can be conveniently generalized to cover any size of electorate.

When the number, n_I , in the indifferent community is large and even, the chance of equal division of votes tends to equal $\sqrt{2/\pi n_I}$. If n is odd, there are two similar chances of equalizing by using this one extra vote, these two chances can count as equal to one such chance of winning. The power, P , of the individual free vote beside an indifferent community of n_I persons is, thus, simply $\sqrt{2/\pi n_I}$ or $0.7978/\sqrt{n_I}$. For practical purposes that is the reciprocal of the square root of the number. Beside a committee of 25, for example, the power of an extra vote is 0.160; with a group of 100 voters it only drops to 0.080 and, in an electorate of 10,000, its power is still noticeable, 0.008.

The power of one vote on a yes or no issue in a randomly voting community is, thus, surprisingly strong even when the numbers are large. In reality, of course, there are always blocs in the population of varying sizes and degrees of resoluteness; and these weaken the individual's chance of exerting a decisive effect. The power of a small resolute bloc of n_R voters is, in fact, measured by

$$n_R \times \sqrt{2/\pi n_I}$$

(d) CONCLUSION

It may be asked what relevance this formal discussion has in relation to the real facts of voting and the means by which

decisions are actually taken in human committees and councils? If all members of a group are equally capable, the will of the majority can be actually enforced. However, it is only infrequently that matters of importance are really voted upon. Most commonly, members of minorities are aware that they will not succeed if matters are voted upon and are obliged to tolerate, or to learn to tolerate, the rules made by potential majorities.

Furthermore, in practice, the business of committees and councils is, to a large extent, ceremonial and unanimous, or almost unanimous, voting is the rule in such matters. In these instances the group behaves as a unit of people all with the same idea or mode of reaction. The discussion of the development of similar reactions in large or small numbers of people belongs to the dynamics of crowd psychology. Strictly, it is only when a fresh idea is presented to people, who have not had previous opportunities for its consideration, that an approximation is reached to the formal conditions outlined here. Each member of an indifferent group is supposed to be acting quite independently. That is to say, I have been analysing conditions in which there has been little opportunity for the development of any mental contamination. The dynamic processes by which blocs are formed are usually thought to be the main subject matter for the crowd psychologist and I will now proceed with the attempt to analyse some of them objectively.

CHAPTER III

ANALOGY BETWEEN MENTAL AND PHYSICAL EPIDEMIOLOGY

I now pass on to the dynamic aspect of crowd psychology. The phenomena under consideration are dynamic in that they are processes rather than structures and the time element is of fundamental importance. Emphasis will be laid upon the close analogy between the epidemiology of infectious diseases carried by bacteria or viruses and the dissemination of ideas in communities.

Medical epidemiologists are in general agreement that, in the study of infectious diseases, it is convenient to separate three aspects of the subject matter. According to Stallybrass, the primary factors are (1) the infective agent, whose nature, variability and virulence have to be considered, (2) the means of transmission, and, (3) the degree of susceptibility or of resistance in the people who are exposed to the risk of infection. The successful control of epidemics depends upon the understanding of all these factors. Sometimes it may be possible to identify and destroy the virus. In other circumstances, measures designed to limit the spread of infection may suffice or it may be more feasible to increase artificially the resistance of the exposed members of the community. The best practical method of control is determined by the state of knowledge on the subject at any given time. This knowledge progresses slowly and by a variety of means. The control of typhoid fever, for example, was enormously facilitated by the discovery of the agent, *bacillus typhosus*, and of its natural history. Since there is no prospect of abolishing this organism from the face of the earth, the examination of its mode of

spread from one person to another and the experimental investigation of individual resistance are still important. Epidemiology, the study of the natural history of epidemics, remains to be undertaken in the case of every infectious disease where the agent still persists after its recognition.

Special emphasis is laid by Greenwood on the necessity of obtaining accurate numerical records of physical diseases of crowds. A great deal of information about the nature of the infective agent and about personal immunity can be obtained from numerical analysis of the structure of an epidemic. The rate of spread of an infection at a given moment is a typical measurement and this depends upon the incubation period, the population density, the mode of transmission—whether the agent is carried by air droplets, water, food, contagion, and so on—and upon innumerable other factors. A water borne disease, for example, usually attacks simultaneously the class of people who are accustomed to making use of the same supply for drinking purposes. An epidemic due to temporary contamination begins and ends suddenly. The perfect example of an explosive epidemic occurs if an outbreak of typhoid fever follows the consumption of contaminated oysters at a banquet or ice cream at a picnic.

The form of the curve of distribution of cases by time is a matter of great interest and some controversy. By studying it, a distinction can be made between epidemics which are merely explosive and non-self-perpetuating and those which are not. If the disease perpetuates itself, the epidemic may begin with one or two cases in the same locality. Then some more cases develop in the neighbourhood and the disease spreads out like ripples on a lake after a stone has been thrown into the water. The number of new cases, recorded from day to day or week by week, at first increases rapidly. Brownlee, one of the first statisticians to analyse data of this kind,

emphasized the exponential, or compound interest, form of the curve obtained in the initial stages of such epidemics.

The arithmetical study of an epidemic can be used to aid the analysis of various phases in its development. The phases which can be theoretically distinguished are as follows. First, a latent period during which the virus is actively multiplying but producing scarcely any appreciable effects. Secondly, a phase of increasingly rapid spread of infection. In this phase, the number of cases increases with respect to time, after the manner of compound interest. There could be one case recorded on the first day, two more on the second day, four more on the third, eight on the fourth day, and so on. In the third period, the activity shows signs of waning. The compound interest rate of increase gives place to a fairly constant rate. The cause of the decline can be attributed partly to saturation of the susceptible population. In actual fact, the decline is usually found to be too rapid for this hypothesis to be sufficient. The beginning of development of fresh immunity or the strengthening of pre-existing immunity in contacts must also be taken into account. The third phase merges into the fourth phase in which there is a diminution of the rate of occurrence of new cases. In this period, immunity has developed so widely that the susceptible population is greatly limited. Finally, the fifth phase of subsidence is reached in which the fresh cases either disappear altogether or return to the average level of incidence existing before the epidemic began.

The view of an epidemic as a self-regulating phenomenon, capable of biological and statistical analysis, advocated by Brownlee to explain the changing incidence of plague, both in men and in rats, was found convincing by Greenwood. If it were not for the development of active immunity as a barrier to the spread of infectious diseases, the arithmetic of

epidemics would tend to resemble that of a chemical reaction much more closely than is actually the case. The geographical structure of the community and the accessibility of its members, to one another or to the carrier of the agent, also produce disturbing factors in attempts at formal analysis. Further, natural or inborn differences in susceptibility tend to limit or extend the scope of crowd infections in a manner for which it may be most puzzling to account. Finally, the infective agent itself may alter in virulence during the course of an epidemic though this is not usually considered to be a factor of importance unless the epidemic is of very long duration.

In the analysis of psychological upheavals, I propose to examine how far they can be fitted into the patterns described by epidemiologists. In the mental field, the agent will be an idea in the sense already indicated. In the instances chosen it will often be a pathological idea, disruptive to the community in which it becomes prevalent.

Besides the analogy in pattern of a single epidemic of a disease like typhoid fever or plague with a crowd mental disturbance, there are also psychological analogies with periodic epidemics, like those of measles, and with endemic or persistent diseases which show little fluctuation over long periods of years.

I shall now turn to the practical analysis of definite examples of mental disturbances in crowds. Material available for such studies is difficult to obtain. Some examples are well described from the point of view of human behaviour and, in others, numerical data can be obtained. A complete picture, however, requires that both aspects should be well documented in a manner which has unfortunately not usually been done. The examples chosen are not necessarily the best which might be available but they serve to show how analyses can be attempted and to indicate the importance of the

numerical approach. At the same time, I have tried not to neglect examination, in each case, of the nature of the infectious idea, its means of transmission and the circumstances present in the community which facilitated the occurrence of the outbreak.

The reader who finds the analogy between physical and mental epidemiology unacceptable may be reminded that the similarity between physical and mental infections was observed long ago by Hecker in his study of mediaeval crowd behaviour. Besides describing plagues and fevers which ravaged civilized communities he studied social manias, propagated 'on the wings of thought', associated with religious fanaticism characterized by wild dancing and leading to epileptiform seizures. In fact, Hecker demonstrated that the whole group of crowd illnesses could be investigated from a common viewpoint without inconsistency.

CHAPTER IV

ANALYSIS OF CRAZES

A new idea which suddenly becomes important in the life of a community and which nevertheless does not appreciably disturb the pre-existing order can be called a craze. Examples are easy to find. A new game or pastime becomes popular almost overnight. The cult of a toy, Yo-yo, Bifbat, the crossword puzzle or a comic strip character, arises in an apparently unpredictable manner and vanishes again. Fashions in food and novelties in male and, especially, in female attire often show the same type of capricious advent. There can also be periodicity dependent upon the seasons of the year. Some crazes are merely magnifications of activities which are part of the normal life of members of the community, that is, endemic. Quite frequently, after the disappearance of a craze, the activity remains as part of the stock of possible pastimes without commanding any special attention when it occurs. When they hear an old-fashioned popular tune, people only remember vaguely that at one time everybody was expected to react to it with considerable emotion. The characteristic features of the craze, though they may seem trivial at first glance, are of great importance in the study of crowd psychology because, in the craze, we are able to examine in its purest form the behaviour of a crowd under the influence of an infectious idea.

Judged from the psychopathological point of view, a craze is a crowd disorder so mild that it can be compared with an outburst of enthusiasm, excitement or anger which occurs in the ordinary daily life of an individual whose mind ranks as entirely normal. An idea which can infect the community,

moreover, is not necessarily harmful or unreasonable because it is infectious. The only justification for including such activities under the heading of crowd mental illness would be that, during a craze, an abnormal amount of energy is discharged in one direction, and that, as a result, matters more vital to the welfare of the group may be neglected.

The course of any craze is marked by certain phases, which sometimes can be very clearly distinguished and which follow closely the pattern shown in an epidemic physical disease. First there is a latent period, during which the idea, though present in the minds of a few, shows little sign of spreading. Next comes the phase during which time the idea spreads rapidly. The number of people who accept the new idea mounts with an increasing velocity which may develop an almost explosive character. As the market of susceptible minds becomes saturated, the velocity of the wave—as shown by the number of articles bought in a given time, for instance—begins to slacken. This is the third phase. The fourth phase is marked by the development of mental resistance against the idea which resembles immunity to infection in the sphere of physical disease. During this period, the mental infection wanes; in those already infected, the enthusiasm becomes weaker and there are few new cases. In the fifth or final phase, if the idea still persists, it remains stagnant; either it is incorporated into the occasional habits of many or kept alive in the minds of a few enthusiasts. In favourable circumstances, it may remain latent to blossom again at some future time, when the immunity has disappeared.

If any person should doubt the reality of mental resistance to an idea which has recently been the virus of a craze he should enquire into the experience of commercial firms which manufacture or sell material involved in these mental epidemics. The immunity has two important characteristics.

In the first place, once started, it develops rapidly—probably the degree of rapidity depends directly upon the degree of explosiveness of the outbreak, though this needs to be fully investigated. Secondly, the immunity is highly specific. There is resistance to exactly that form of the idea which caused the craze, but another idea, in many respects similar, may produce another craze soon after the first.

In spite of the great prevalence of crazes in human communities, precise data for the numerical analysis of their development is difficult to obtain. The type of data which would be valuable from this point of view could be obtained from a study of the actual sales of craze pastimes during the critical periods. The demand rather than the supply would perhaps furnish the best index of the crowd's state of mind but there are complicating factors which make the investigator pause before embarking upon the arduous task of collecting the data. Commercial reticence is also a serious obstacle. The example chosen here for analysis is imperfect in many respects, as an instance of a craze, but it has the advantage that the data were easy to obtain. It concerns the development of a fashion in medical therapy. Crazes of this kind are common among physicians and they are, to some extent, the inevitable result of natural enthusiasm over fresh discoveries in medical science. As will be seen, however, there can be more than one side to the picture.

The use of thallium in the treatment of skin diseases, as a preliminary measure to remove the hair, was first advocated in 1914 both in Germany and in Mexico. The pioneers who drew attention to the possible therapeutic use of the metal were careful to issue the warning that poisonous effects of a most dangerous character might arise if an overdose were given. A survey of medical literature between the years 1914 and 1925, charted in Figure 1, reveals the fact that the drug

was, in fact very little used during this period, which corresponded to the first phase or latent stage of the mental epidemic under discussion. In the next two years, however, use of the drug became rapidly fashionable. Thousands of children were treated in centres widely distributed over the globe. During this second period of the infection of the medical profession with the new idea, a large body of literature sprang into existence in which the results of treatment were described and commented upon, for the most part very favourably.

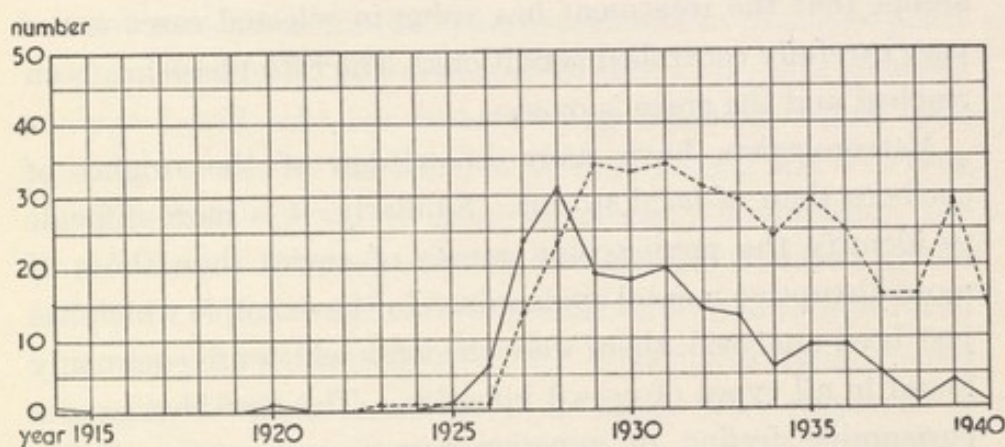


FIG. 1. Literature on thallium therapy (from *Index Medicus*)

— Articles describing treated cases
 - - - Critical papers

The saturation of all possible clinics for skin diseases with the new idea would inevitably have slowed down the craze and produced the third phase about 1927. This effect, however, was masked by the rapid growth of the realization of the dangers attached to the treatment. Several fatalities resulted from overdoses. Some medical authorities proclaimed that the treatment was far more hazardous than the diseases which it was intended to cure. The fourth phase, which coincided with increasing immunity to the idea of this treatment, was reflected in the medical literature by a preponderance of writings which described experiments on laboratory animals

and emphasized the poisonous nature of thallium compounds. At the same time, the total number of writings on the subject declined. From 1928 until 1940, this decline in interest was fairly continuous and recent scientific publications on the use of thallium have, for the most part, been confined to experimental studies, to warnings against proprietary preparations, which might poison unsuspecting lay people, and to descriptions of instances where thallium had been used for attempted murder or suicide. Notwithstanding, medical textbooks now accept that the treatment has value in selected cases under very carefully controlled conditions. The fifth phase has been reached and the craze is over.

Meteorologists have more knowledge of the origins of cyclones than of local storms. Similarly, it is more difficult to identify the predisposing causes of crazes than those of more disruptive mental epidemics. In the example which has just been analysed, there were elements which are commonly found in all types of crowd infection. The new idea gave a pleasurable feeling of superior power, and was probably welcomed by physicians as a visible proof of omnipotence which they might wish to possess. Furthermore, the factor of relative isolation from the general public, which the medical profession enjoys, possibly favours the development of crowd mental aberration among its numbers. Such epidemics as that described in the example might be even more frequent or significant among medical workers than is actually the case were it not for the lengthy and humiliating training in scientific caution which physicians undergo before qualification. A comparison of mental epidemiology between members of the medical profession with members of other groups, whose training is much less intensive from this point of view, such as osteopaths and chiropractors, might be instructive.

CHAPTER V

OUTBREAKS OF RELIGIOUS ENTHUSIASM

Some of the most remarkable and neatly circumscribed instances of mental disturbances in crowds are to be found by studying infection with religious ideas. In such cases, it is not uncommon for the ideas to emanate from a focal point which is formed by the delusions of one man. For detailed analysis I will take the history of an epidemic which took place in Canada in the autumn of 1902 among the members of an isolated group of Russian peasant immigrants, the Doukhobors. Elkinton records how several hundred of the colonists of Yorkton district, Saskatchewan, who numbered 5,500 in all, became deluded by a religious fanatic—not originally of their community or faith—who posed as a prophet. Several hundred men, women and children marched thirty or forty miles 'in search of Jesus'. They were bent on a pilgrimage to evangelize mankind. The women and children were prevented from going further than Yorkton itself by the civil authorities but the men went on to Minnedosa, some 150 miles in the direction of Winnipeg. Here they were put on a special train by the superintendent of immigration, taken back to Yorkton, and so returned to their homes. A reporter from the New York World described the migration after the departure from Yorkton. 'I overtook them at Binscarth,' he writes, 'a little village on the north-west branch of the Canadian Pacific Railway, about 200 miles from Winnipeg. They came straggling into the town in a procession two miles long. Picturesque figures they were, mostly clad in blue and with gaily coloured scarfs. Though snow lay three inches

deep on the ground, fully a score were barefoot, more than double that number were hatless. In front strode a majestic figure, black as Boanerges with a voice like a bull of Bashan. He was barefoot. On his head was a brilliant red handkerchief, and his body was clothed in a long dusty white felt mantle reaching almost to his feet. He strode along at the head of the procession. Suddenly his face began to work, his eyes to roll and his hands to twitch, and in a few moments he began to jump in the air, clutching with his hands and shrieking aloud in Russian, 'I see him! I see Jesus—He is coming! He is here now, my brothers! You will see Him soon!' The long cortège stood still, straining their eyes to catch the beatific vision: they talked to each other for a while during which their leader calmed down to a state of almost torpor from which he, without a moment's warning, aroused himself to another religious frenzy. They all expressed their pleasure at seeing me, raising their hats—such as had them used them—with the courtesy innate in the Russians. It was long past dusk. The snow began to fall in flakes. The pilgrims halted and made their pitifully inadequate preparations for camping. With their hands, they tore up some long grass to serve as beds. From his pouch each took a handful of dry oatmeal and munched it. Before flinging themselves down they sang a psalm and quoted Scripture verses responsively as they stood with bare heads while the snow fell quietly over them. Vassili, the interpreter, looked at me sorrowfully, patted me affectionately on the shoulder and gave me a word of parting counsel. 'We all of us wish you,' he said, 'not to smoke, not to work for money. We love you. We tell Jesus to come for you. Good night.' Writing in the *Montreal Weekly Witness*, Dr J. T. Reid gave his opinion at this time thus, 'Just as every Anglo-Saxon craze runs its course, declines and disappears so it will be with this fanatical exuberance of the

Dukhobortsi'. Within two weeks, all the men were reported to have returned to their homes and their former mode of life.

In this excellently circumscribed instance of crowd mental infection it is possible to set out nearly all the component elements. The predisposing causes were, apparently, (a) isolation, geographical, linguistic and religious, and (b) homogeneity within the group, both in respect of racial origin and occupation. Increased sensitivity may have been directly due to the fact that the whole group of immigrants had only recently been settled in their new home and supplemented by restlessness born of many wanderings, adventures and persecutions. The immediate cause of the outbreak was the development of an abnormal mental condition in one of their number who, like most successful fanatics, was only a member of the group by adoption. The exact psychiatric nature of his condition cannot be stated, but it was clearly a very acute attack with symptoms of mania accompanied by hallucinations. The content of the ideas, which he sowed in the fertile soil of the minds of the settlers, took root in the case of one tenth to one fifth of the whole population, and galvanized them into action of a type which, without much doubt, can be classified as abnormal and disruptive to the community itself. Adults of both sexes were affected and perhaps also children. Unfortunately it is not recorded how long the early phases of the epidemic lasted. This defect in the history serves but to emphasize the necessity of making more detailed observations of the sequence of events in instances of this kind. What we need to know here is how long the specific ideas, which gave rise to the outbreak, were present in the minds of the people who took part in the exodus. Before that, how long were they present in the mind of the maniac, who was immediately responsible for infecting the crowd? The first, or latent, phase may have been a very long one ; the second

period during which the idea of evangelizing the world spread through the group, may have lasted weeks or perhaps only a few days. At the time when the march from Yorkton had actually begun, probably few new converts were being made and the third phase was already in full swing. The reporter from the New York World came upon the crowd in what must have been the fourth phase, when many of the group were probably doubting the validity of the enterprise. Indeed within two weeks of this date the epidemic had subsided completely. The duration of the whole affair was probably a matter of a few weeks only. Though from the formal, quantitative, point of view, the incompleteness of the record precludes detailed analysis, the incident is instructive in a qualitative sense.

The ideas which influenced the group so forcibly here were of the grandiose type. It is easy to imagine how they could have been acceptable to members of an isolated, persecuted, group. In exchange for having their religious convictions despised by the majority of people, a modification of their views was to be made the doctrine of all mankind. Unfortunately, the whole scheme was soon proved by hard facts to be unsound and gradually the momentum of the craze grew less. The women seem to have been more easily dissuaded from continuing the march than the men. The disruption caused in the community itself by the epidemic shows that the events can rightly be regarded as pathological phenomena, due to abnormal ideas, to which immunity rapidly developed as foreseen by an astute contemporary observer. Finally the significance of the fact that the leader was not originally a member of the community must not be overlooked. It is easier for a stranger to arouse to active expression the slumbering desires in a population than it is for one of the true members of the group to do this. By his training and temperament,

the stranger, who adopts the faith of the group, is immune to many of the inhibitions which prevent those thoroughly accustomed to the faith from taking too seriously its unreasonable implications.

An aspect of religion, which is susceptible to metrical analysis, is the recorded numbers of adherents to any given sect over a period of many years. Religious ideas are found in every phase of human society and, for the most part, the rituals are endemic. It has been said that endemic religion is a necessity for human communities and that its rituals act as an insurance against mental disturbances. The exacerbations of religious activity and the replacement of one type of belief by another could form the basis of quantitative studies of crowd behaviour if records were available. The stratified organisational structures by means of which cults are stabilized are also of interest.

CHAPTER VI

PANIC REACTIONS

The panic differs quantitatively from the craze in that its onset is always extremely rapid. The spread of an idea which causes a panic takes place with the speed of an explosion. The crowd becomes saturated with the idea before there is a chance for immunity to develop. Thus these mental storms may have seriously disruptive effects upon the communities in which they develop. On the other side of the balance sheet, however, the panic may cause less permanent damage to the community than an epidemic which develops insidiously and slowly. In medical language, a panic is a very acute condition from which complete recovery is to be expected unless, like the Gadarene swine, the community is exterminated during the illness. The infective agent in explosions of this kind is always associated with the emotion of fear and the verbal expression of the idea concerned is often primitive, ambiguous or inchoate. The more definite the idea, the less is the likelihood that it will produce panic. If a manifestation of fear in one member of a crowd is transmitted to another member, before the cause of the fear is properly understood, the presence of the transmitted fear precludes further successful attempts at understanding. The simplicity of the idea enables it to be communicated almost instantaneously. Once the conditions for transmission from person to person are established, a self-perpetuating reaction proceeds with great rapidity and transforms almost the whole crowd which is accessible to the influence. Cases of panic disorder are not easy to analyse in detail numerically but the total number of persons involved, their geographical distribution and the time

scale of events can often be ascertained. On account of the explosive nature of panic reaction, individual or collective immunity is of significance only if it is already present at the time when an idea capable of arousing panic first manifests itself. Among predisposing causes, ignorance, which is a form of relative isolation, seems to be as important as any. Some examples will now be discussed.

The time schedule of a run on a bank in a small town in the United States, described by Vaught, is instructive. A neighbouring but unrelated bank in the district had just failed and the news caused a panic the next day. At 10 o'clock in the morning a few people came and demanded their money. By 11 o'clock the entrance lobby was crowded and at noon it was impossible to pass through it. Clothes were torn and people fainted. Many of the clients lost more money than they were able to take out of the bank by having their clothes torn. Passers-by looked at the crowd curiously and a number of them joined it though they were not themselves clients. Even some of the bank clerks exchanged their holidays for cash. At 2 o'clock the place was still too tightly packed for people to move about but many of those inside would gladly have given all the money they had to be able to get out again. Like the foremost animals in a stampeding herd of cattle, the original instigators were now disillusioned but were pushed onwards unwillingly by the excited throng behind them. Soon after this, the situation eased.

From the evidence available, the different stages in this epidemic cannot be set out very clearly. The fear that the bank would become insolvent developed in the minds of a few people, who were ignorant of the absence of connection between the bank which had failed and their own bank. When once the word had begun to go round, 'If you have money in the bank you had better get it as soon as possible', the dissemina-

tion of information of a technical character would not have prevented the spread of the panic. Secondary factors which favoured the spread of the idea were very noticeable in this example. The fact that a great number of people are thinking or acting in a certain way itself helps to break down any resistance to the new idea in the previously unaffected members of the crowd. In the present example, the effects of this facilitating factor were so marked that even some of those who were not members of the original group of clients were dragged into the vortex. Unfortunately, neither the total number of clients nor the proportion which was affected by panic was ascertained, though this information, together with the total number of persons who were demanding their money at any given time, would have been most valuable to the study of the outbreak. The latent period, however, can be assumed to have lasted several hours, the second phase, and perhaps also the third phase, about one hour, and a considerable degree of immunity seems already to have been acquired by many members of the crowd by 2 o'clock. The example is interesting in that the pathological nature of the outbreak is clearly demonstrable. The results were not serious though, apart from the secondary damage done by tearing of clothes, partial suffocation and waste of time. The whole idea on which the performance was based was self-contradictory since, if the financial situation of the bank had been difficult at that time, the sudden withdrawal of the support of its clients might really have caused its collapse.

It is noteworthy that many financial systems based upon credit are at the mercy of panic reactions. It is always assumed, however, that the chance that every creditor will wish to, or be able to, demand payment at the same time is infinitesimal. The soundness of many financial undertakings depends, in a large measure, upon whether or not people think

they are sound. In a period of crisis, the drain upon the resources of a company may exceed reasonable expectation on account of the large numbers of clients who may be affected by panic. In such times, well-organized corporations may go down to ruin with those of unsound construction. However, the large firms always have an advantage over the small ones, because at any time the chance that the desire to sell out is in the minds of a sufficient proportion of the clients to cause collapse of the business diminishes as the number of clients increases. In general, the stability of an organization grows as the square root of the number of its clients and there may be optimal sizes which are both stable and not too unwieldy to administer.

The panic, which took place in the United States on 30th October 1938 in consequence of a broadcast programme, 'Invasion from Mars', has been studied in detail by Cantril. By examining his records, the structure of the outbreak can be understood better than that of almost any other example. Between 8.0 p.m. and 9.0 p.m., a realistic play was broadcast in which imaginary events of strange and terrifying character were described by people who pretended to be authoritative eye witnesses. About six million citizens heard the whole or part of the broadcast and at least one million were seriously disturbed by it. There was a definite panic and many people thought the end of the world had come. Some rushed into the streets on foot, others dashed wildly about in their cars; those indoors, affected by the panic, huddled round their radio sets trembling and weeping in each other's arms or lay on the floor paralysed by fear. Individual case studies of sample populations, which were undertaken after the event, revealed many illuminating facts. Rather less than half, of those who listened in, discovered that it was only a play either accidentally or by using their common sense. A close relationship,

moreover, was found to subsist between the condition of being frightened and inability to question the authenticity of the information. The group of listeners who suffered most, of whom three quarters reacted abnormally, received information from others that there was something they must listen to on the radio. Those people who relied partly upon the validity of other people's judgments comprised nearly one fifth of the total number of listeners.

In the analysis of this episode, from the point of view of crowd psychopathology, the mode of dissemination of the stimulus ideas attracts comment. By means of the radio broadcasting, simultaneous contact can be made with an enormous number of independent centres of receptivity. This part of the mechanism of the epidemic resembles the effects due to the contamination of the main water supply to a district with cholera or typhoid germs. The source of the epidemic was an idea in the minds of the producers. This was mechanically disseminated by the radio to listeners through innumerable local receiving sets. Then, in each household the opportunity arose for a local panic to develop. Sometimes the effect remained confined to the small crowd around one radio set. In other cases, it spread outside and then it might reinforce the effect in members of other groups who had strayed out of their initial domains. The reaction as a whole serves to demonstrate one method of spread of an idea in a community. It is better described as a multiplicity of small simultaneous panics than as one great national reaction.

The nature of the stimulus here was so complex, and the duration of the abnormal effects so brief, that the time schedule of the different phases cannot be certainly distinguished. Those who studied the epidemic closely were of the opinion that a predisposing cause was emotional unrest caused by recent war scares. Some important facts, however, came

to light in the surveys of individual cases, taken at random after the episode, which concerned the nature of immunity to panic reaction. As I have previously pointed out, one of the characteristic features of panic is that fresh immunity has very little time to develop. Hence those who are unaffected must be those who already possess a fairly high degree of immunity to the stimulus in question. The investigators of the 'Invasion from Mars' panic found that natural immunity in this case depended upon two factors. One was critical ability, which enabled the listener to make use of past experience to evaluate the present emergency. Though a positive correlation was found between educational status and critical ability, the procedures necessary for finding out that the broadcast information was fictitious were simple and did not require a high standard of general knowledge. It was sufficient to look for the announcement of the programme in a newspaper or to turn the dial of the radio to another station. The improbable nature of the events narrated in the 'Invasion from Mars' broadcast and impossibility of the rapid time sequences in the play should have been sufficient to arouse scepticism. In many instances, however, they served to enhance the terrifying effect by making things seem supernatural. In the psychopathology of panic, the doctrine of Tertullian, '*credo quia impossibile*', attains a new significance, i.e. the more impossible, the more terrible if true. The intellect can be so outraged that it ceases to function. The use made by the Germans, in 1940, of spreading rumours about impossible weapons shows that the principle is known to efficient propagandists.

An unreasonable fear, or the anticipation of catastrophic events, is found to be more likely to precipitate a panic than the actual situation of danger. In 1939, before the second world war began, some psychologists predicted, in articles

published by the British Medical Journal, that the danger from the results of panic in the population, which would be caused by air attacks, was very great. The sponsors of Mass Observation, with their ears close to the ground, thought otherwise: there was no danger of panic at all provided that the people were to be given good information by the government and not treated as machines or imbeciles. Subsequent events showed that the reaction of the majority of the inhabitants of large cities, during periods of intense aerial bombardment, was more stoical and objective than it had been during the period of apprehension preceding open hostilities.* The demoralizing character of a so-called 'war of nerves' depends upon manufacturing a threat of something to which the citizens of the threatened country would have no prepared reaction pattern. One way of making certain of this is for the propagandist to suggest the imminence of some impossible disaster. Conversely, correct information tends to immunize against panic reaction.

A curious feature of the psychology of human institutions, economic, social or political, is that, to a considerable extent, belief in the validity of any type of organization (or disorganization) makes the belief true. The belief that a bank is insolvent tends to break the bank. The belief that military defeat is imminent ensures this defeat. People back the side which they think is going to win in a political campaign, and their backing helps it to win. In a panic, the crowd is infected with the idea of the imminence of disaster and the result may be a disaster—though of a different kind.

Such reactions can be either disruptive or cohesive. The concession of opinion by a minority, when they perceive that a vote will be adverse, is a process structurally similar to a panic but it is cohesive in its results and often can be classed

* See a symposium reported in the *Lancet*, December 1940.

as normal. Sudden panic-like reactions may sometimes be important in the dynamics of the formation of voting blocs. They are also likely to be of significance in the hierarchical control of populations, where free voting is potential and not actual. Extra power is conceded to the men at the apex of the hierarchy by those who would otherwise be neutral or antagonistic because they fear to be on the losing side. In this way, a resolute minority can swell to an actual majority, temporarily at least until widespread immunity develops against the ideas it carries. Thus, a minority movement, as was shown by the Nazi Party in Germany, can achieve power rapidly if it can convince the population that its success is inevitable or even highly probable.

CHAPTER VII

POLITICS

(a) GENERAL PRINCIPLES

A political movement or party consists of a number of people who agree upon certain issues concerning social affairs. The issues may be of an abstract, ideological character or they may be concrete proposals. According to the present treatment of these phenomena, it is assumed that it makes sense to enumerate people of the same political view. The number of people with the same idea, who belong to any given political group or party, can be measured by counting the numbers in a political organization. Those actually belonging to a party form a basic nucleus of enthusiasts which will, presumably, act as a bloc when decisions come to the vote. By counting votes, an estimate can be made of the numbers with the same ideas in large populations, including those who only subscribe temporarily to a given opinion or set of opinions.

Theoretically, in a given community, there can be one, two, three or any number of political groups. However, in democratic systems, which have remained static in structure for long periods of time, there has often been a tendency for two main groups to separate. This may be due to a dynamic process whereby ideas of a political character produce immunity; that is to say, all positive political movements seem naturally to produce opposition movements.

The loss of attraction in a previously popular political idea can be superficially attributed to satiation or boredom rather than to active hostility. However, the matter has not been

very fully investigated by psychologists. The kind of active immunity which develops against an idea may be actually very similar to a state of satiety or boredom. All efficient political leaders know how important it is to keep changing their slogans or promises. By such means they may prevent hostile reactions on the part of the members of the public to whom they wish to appeal. When a tune, which at first was received with rapture, begins to pall, it must be replaced by another : otherwise it becomes obnoxious. But it can be kept in the background and cautiously reintroduced years later when conditions have changed. Political movements show, on a large scale, some of the elements which have been demonstrated in the dynamic processes of crazes and panics. Thus, the study of circumscribed epidemics may help in the understanding of the massive growth of new ideas, in which changes are much slower. In the mental changes of large populations, lasting over many years, the phenomenon of periodicity is not infrequently noticeable. After a political idea has grown up in a community and has persisted long enough to produce a massive immunity it is likely, for a time, to disappear or to become merely endemic. After a sufficient period has elapsed for immunity itself to have faded, either in the same population or in its descendants, the time may be opportune for a recurrence of the old infection. The tendency for the popular vote to swing from the programme of one party to that of its opponents and back again can be attributed partly to the periodic growth and decline of immunity in the population.

(b) TWO-PARTY SYSTEMS

In examining the natural history of systems in which two political parties only are mainly concerned, reference must be made to the easily observed human tendency for the formation

of two opposing sides in a game. Here, two groups, or teams, are formed which have a curious reciprocal relationship to one another. Both sides have the same idea about the type of contest and they agree to compete against one another. Ideas of cohesion within the one group, together with antagonism towards the rival group, also spread to the opposing group and intensify the struggle. According to Freud, these groups owe their existence to a fundamental conflict in man's psychological nature. By such means, this conflict is resolved; satisfaction and stability are obtained for each individual participant's mental mechanism. That is to say, the duality of ideas in the team, political party or nation is in each case similar. The members of the group within the particular universe seem good to one another. They and their leader are loved but the opponents and their leader are treated as bad and are hated. This relieves the individual from the internal conflict which would make him simultaneously love and hate himself and his ideals. This statement is, of course, a gross over-simplification but it cannot be doubted that men obtain profound satisfaction from the system of behaviour which involves two opposing teams. Furthermore, these systems are often found to be very persistent and stable in that they attract closely equal numbers to both sides. Statically, the equality of two opposing political groups can be attributed to indifference of the whole population to the alternative issues concerned. Dynamically, however, the processes of reciprocal spread of ideas and of subsequent immunity to these ideas in two opposing groups probably often tend to balance one another. The balance, however, is unlikely to be precise and periodical swings of opinion to one side or the other are to be observed when numerical data are available.

As a concrete example of numerical analysis to facilitate

the understanding of both the statics and dynamics of political opinion, I have taken the figures, which are given in Table 2, from United States Presidential Elections over the period from 1844 to 1944. These voting data have the advantage that they cover the whole electorate and that there have been usually only two candidates of consequence in each four-yearly vote. The votes for the minor candidates have been eliminated from the figures. There has been a fair degree of continuity of the system over a whole century so that trends can be examined as well as the static conditions at any given moment.

It follows, as a corollary from the discussion in Chapter II. that, if voting were entirely at random, the margin by which one of two candidates was elected could be estimated from the number of voters. Thus, in random voting of an electorate of n persons, the majority, D , would be such that the mean value of D^2/n , over an indefinite period of years, would equal unity.

In the twenty-six American Presidential elections, recorded in Table 2, D^2/n is never less than 6 (in 1880) and twice it exceeded two million. This marked excess over the theoretical value of unity may be interpreted as indicating that the voters did not vote as random units but were grouped into blocs which voted independently. The approximate size of each of a set of blocs taking the place of individuals is given by the actual mean value of D^2/n , measured over a period of years. Figure 2 shows the comparative majorities in the elections from 1844 onwards. For convenience of demonstration, D/\sqrt{n} is charted instead of D^2/n . It is clear that, in the period 1844 to 1900, the magnitudes of the majorities kept within a consistent range and, according to this index, did not tend to become appreciably greater as the population increased. The electorate in the first fifteen instances could be regarded as composed of about 245 blocs containing 29,000 voters each,

Table 2

VOTING IN THE UNITED STATES OF AMERICA. Major Parties :
 Popular Vote for President : *A* signifies votes for Democrat,
 Democrat-Liberal or Democrat-People's Party : *B* signifies votes
 for Republican or Whig Party.

<i>Year</i>	<i>A</i>	<i>B</i>	$(A - B)^2 / (A + B) = D^2/n$	D/\sqrt{n}
1844	1,337,000	1,299,000	492	+ 22
1848	1,221,000	1,370,000	8,569	- 93
1852	1,601,000	1,387,000	15,327	+ 124
1856	1,928,000	1,392,000	86,535	+ 294
1860	1,375,000	1,866,000	74,385	- 273
1864	1,809,000	2,216,000	41,155	- 203
1868	2,710,000	3,015,000	16,249	- 127
1872	2,834,000	3,597,000	90,525	- 301
1876	4,285,000	4,034,000	7,573	+ 87
1880	4,442,000	4,449,000	6	- 2
1884	4,911,000	4,848,000	407	+ 20
1888	5,540,000	5,444,000	839	+ 29
1892	5,554,000	5,191,000	12,263	+ 111
1896	6,468,000	7,036,000	23,891	- 155
1900	6,358,000	7,220,000	54,724	- 234
1904	5,084,000	7,629,000	509,480	- 714
1908	6,409,000	7,679,000	114,487	- 338
1912	6,286,000	3,484,000	803,603	+ 896
1916	9,130,000	8,538,000	19,836	+ 141
1920	9,147,000	16,152,000	1,884,621	- 1,372
1924	8,386,000	15,725,000	2,233,873	- 1,495
1928	15,016,000	21,392,000	1,116,606	- 1,057
1932	22,822,000	15,762,000	1,291,807	+ 1,136
1936	27,477,000	16,680,000	2,640,017	+ 1,625
1940	27,243,000	22,305,000	492,126	+ 702
1944	25,603,000	22,006,000	271,764	+ 521

every bloc voting independently and at random (see Table 3). After 1900 a change came and the amplitude of the majorities, in the direction either towards the Republican or Democratic side, was greatly increased. In the last eleven elections, the

mean size of the blocs in the popular vote can be estimated at 1,034,000 persons. The average number of voters in these last eleven elections was 29,087,000; the number of hypothetical independent blocs which could have produced similar results would be only 28. That is to say, the raw figures of these elections are consistent with the hypothesis that, up till 1900, the American public acted as 245 indifferent equal blocs of voters and since then it has acted as 28 blocs. It may be

Table 3

<i>Period</i>	<i>Mean number of voters</i>	<i>Mean D^2/n</i>	<i>Supposed number of independent equal blocs of voters, N</i>
1844-1900	7,116,000	29,000	245
1904-1944	29,087,000	1,034,000	28

that, as a population grows larger, it coagulates into blocs more readily.

There are several other interesting points which arise from studying Figure 2. The tendency for the voting to swing first to one side and then to the other in a rather regular manner is noteworthy. Peaks of success for Democratic candidates occur at intervals of approximately 20 years, that is, in 1856, 1876, 1892, 1912 and 1936. Corresponding maximal majorities for Republican candidates occur in the intervening years, though not quite so regularly. It is remarkable how accurately the swings in one direction have been compensated by swings in the other direction, indicating, perhaps, a natural tendency for immunity to redress the balance.

There is, of course, no certainty that the two-team or two-party type of politics will maintain its structure even if it remains stable. If one side attains too convincing a majority, it may tend to split into smaller groups by virtue of internal

dissension. Curiously enough, this process may lead to a new equilibrium similar to the original one. Thus, in the British Parliament, in the nineteenth century, from 1837 until 1906, there was, in the main, a contest only between Liberals and Conservatives. Thereafter the Liberals, who had obtained a more decisive majority than either party had previously

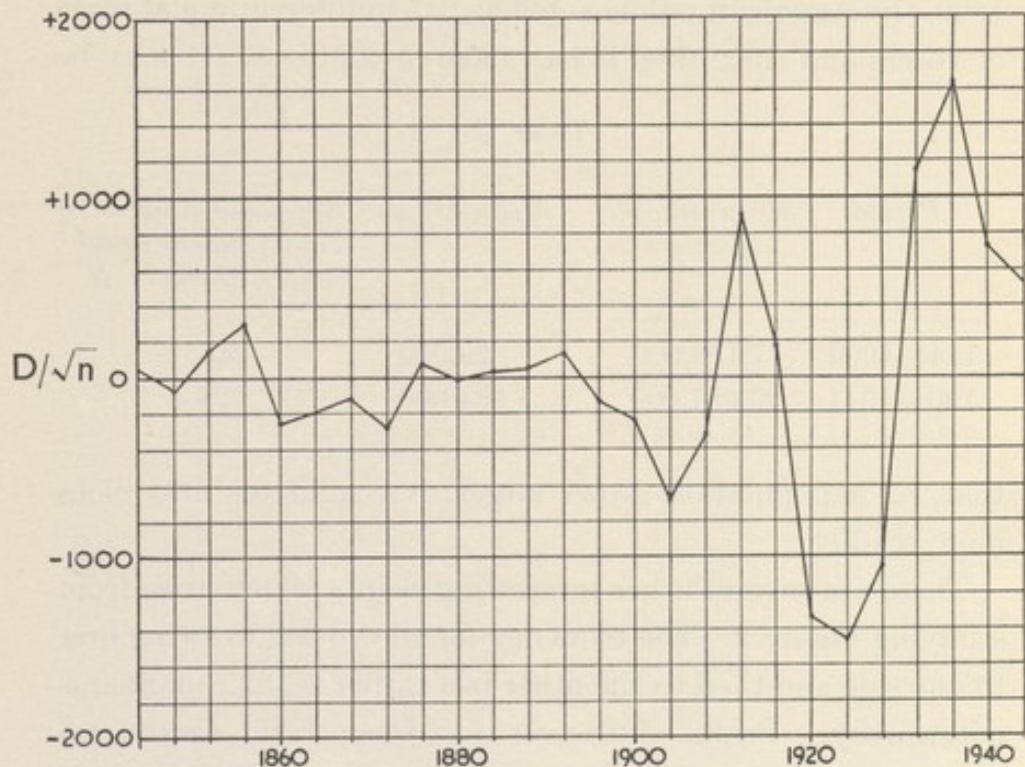


FIG. 2. Popular Vote in U.S. Presidential Elections (see Table 2)

obtained, seemed gradually to divide into sub-groups. The largest of these sub-groups, Labour, after many vicissitudes eventually emerged as a team capable of creating again a two-party structure. Unfortunately, the voting figures for the United Kingdom are not susceptible to direct analysis as are those of the American presidential elections. The voting is divided into constituencies and some members are returned unopposed.

In many countries with parliamentary systems, the ten-

dency for two major parties to continue for long periods has not been evident. There can be sets of minor, or 'splinter', parties of varying sizes and fortunes. Under the British system of divisions or local constituencies, it is very difficult for a minor party to obtain representation unless its adherents are all concentrated in one or two localities. In countries where there is a parliamentary representation in proportion to votes cast over the whole country, however, small parties receive proportionate treatment and so are encouraged.

Besides tending to reduce the contest to two parties only, the system of constituency representation has another interesting property. In the elected assembly the difference in proportions of the two parties is much more marked than the difference in the total electoral votes. In the British parliament an empirical relationship called the law of cubic proportions has recently been discussed by Kendall and Stuart. The idea, which is said to have originated from MacMahon, was mentioned in evidence to the Royal Commission on Systems of Elections in 1909. It is stated that if the numbers of votes for two parties in the electorate are in the ratio $a : b$, then the number of seats obtained, A and B , will be in the proportion $a^3 : b^3$. The rule is quite empirical and equivalent to saying that the parliamentary majority per cent. is about three times as great as the popular vote majority. The result can be interpreted as showing that each constituency behaves as though it contained N random voters, the general formula being $A/B = a^r/b^r$ where $r = \sqrt{2N/\pi}$. In British elections N is about 14. The whole electorate, on the basis of election results since 1850, can be estimated on a two party system to consist of about 140 independent blocs. There are, thus, in effect, only about 10 constituencies containing 13 or 14 random voters each. Thus, the results of a British election could be mimicked by tossing, say, 13 pennies 11 times.

(c) EQUITABLE REPRESENTATION

The equitable allotment of votes on a central council or parliament, when constituencies are of widely different sizes, presents a problem which is of considerable interest. It may be considered desirable that each region should be as fairly represented as possible, taking into consideration that some regions may have far more voters than others. In a national assembly, there can be little excuse for failure to divide the electorate into constituencies containing equal numbers of electors, though, for geographical reasons, this may sometimes be inadvisable. In an international assembly, however, the problem cannot be resolved in this way. Nations vary greatly in population numbers and the needs of different groups are strongly influenced by geographical and cultural boundaries. Small countries, like Iceland and Switzerland, have natural boundaries and characteristic social developments, so also have some very large countries, like the U.S.S.R. and China. In bodies such as the League of Nations and the United Nations Organization, countries with vastly different numbers of inhabitants are each provided with one vote. This can hardly be considered equitable unless it is supposed that the value of the opinion of a representative is inversely proportional to the size of the country from which he comes. This may be true but it is not necessarily so. In a previous publication, I made a suggestion attempting to provide a general solution to this problem on the basis of the argument set out in Chapter II. As a contribution to the arithmetic of political systems it seems possibly relevant to give a brief account of it here. Political stability may depend to some extent upon the voter's belief that he is as fairly treated as possible and the stability of international organizations perhaps could be increased if constituent

national groups could be convinced that they were equitably represented.

It will be recalled that, in the theoretical situation where every voter gave a random 'yes' or 'no' to a given question, the most probable size of the majority, or 'edge', (or D as I have called it) in either direction is equal to the square root of the number of individual voters. Now, a representative who has been elected by such a population can only be said to represent the majority, or 'edge', of the voters because the rest of them can be said to have effectively paired or neutralized each other's opinions. Conversely, an elected representative of a given constituency or country can only expect to satisfy a proportion of voters in his own country equal to the square root of their numbers. He will not know, and his original sponsors will not be able to predict accurately, what questions will be raised on the main assembly so that the original votes are really almost at random with respect to these decisions of the future. There appears, thus, to be some formal justification for suggesting that the voting power of the representative on a national or international body should be made proportional to the square root of the number in his own electorate.

There is also the argument of common expediency to be considered. It is obviously unfair that, say, Iceland with an electorate of little more than 100,000 should have a voice in world politics equal in force to that of India with, perhaps, 250,000,000 potential electors. It would be equally absurd if the powers allotted to an international body were arranged on a *per capita* basis. This would mean that Iceland's position would be absolutely meaningless with one vote against India's 2,500. It would be much less unreasonable for the relative voting powers of the two countries to be in proportion to the square roots of their electorates, that is as

50 to 1. Similarly, China and Switzerland would be more equitably represented on the square root basis in the ratio 10 : 1 than by equality or on the *per capita* basis of 100 : 1. On the whole, small nations would obtain some advantage from the square root system but not an unreasonable one. Furthermore, mistakes in counting the numbers of electors would have much less effect on calculation of the voting powers of large populations than of small populations which would be easy to check. If a country voluntarily reduced its own power by fission into two or more smaller states, it would not lose power proportionately in the international assembly. Nor would it by this process gain excessively if the divided country subsequently voted as a bloc in the assembly. A country would have to divide into four equal parts in order to double the voting power of the new bloc while its own power would only be halved. But it would take the risk of being out-voted by its new companions.

It has been pointed out that any weighting of votes in an assembly makes a secret ballot difficult. This hardly seems to be a serious objection. Supposing that one country's representative has several votes and fears that the exact number may be recognized, he can cast one or two less and avoid detection. Also there is advantage in having several votes since they can be divided and distributed to both sides, rather than abstaining, as circumstances indicate. On the whole, the static arithmetic of crowd voting, as well as common sense, favours some method of weighting to redress the unavoidable inequalities of representation on international bodies. The use of the square root of the electorate, or an approximation thereto, would seem a logical way of stabilizing the voting powers of representatives. (See Appendix.)

CHAPTER VIII

WAR

In all the wide variety of human activities, there is none which provides more extensive and critical material for the study of crowd behaviour than warfare. Writers on the subject lack unanimity as to the nature of war. Huxley described it as a rare biological phenomenon characteristic only of men and certain types of ants. It can be scientifically designated 'intraspecific organized conflict'. The results of war are extremely unpleasant to a large proportion of any population which becomes involved in it. Violent death, famine and disease are carried in its wake but there have been, and still are, many people who consider it to be a normal human activity. This is shown by well-known dicta, such as that of the school of Clausewitz, implying that war is simply the continuation of policy by different methods. In criticizing the statesmen who put their faiths in the power of treaties to preserve peace, Clemenceau exclaimed, at the Versailles conference, 'We can turn round that aphorism and say that peace is a war carried on by other means. Life,' he said, 'is a struggle, and you will never prevent that struggle'. The point of view implied here, that the only kind of struggle worthy of absorbing the main energies of mankind is war, was expressed by Ludendorff in the statement, 'Both war and politics serve to maintain the state, but war is the highest expression of the national will to live'.

According to the criterion of normality used in the present study, the necessary assumption for regarding war as a normal activity would be that it benefits the community in which it occurs or, at least, is not disruptive. It is held by some

writers, such as Angell, that the effects of war are detrimental to the victorious side as well as to the vanquished. However, war may be associated with increased cohesion between individuals and groups within a belligerent nation. Such development of unity of ideas within geographical groups carries to an extreme the processes previously mentioned, which characterize teams in sport and parties in politics. For short or long periods, these loyalties within national groups can be very advantageous to the nations concerned. Unfortunately, competition between national groups appears to be carried on at an infantile level of behaviour. Unlike competitions between smaller groups and teams, warfare between nations is accompanied by involution of standards of social behaviour. That the enemy's standards are lowered is never in doubt, though a blind eye is turned to the alteration of morality within friendly circles. In no crowd activity is the dual type of behaviour, described so often as typical, more clearly demonstrable. After the second world war, Lord Wavell said, 'The ideal soldier has to be a blend of poacher, cat burglar and gangster'. With regard to training, Major-General C. L. Scott (U.S.A.) said more recently, 'We've got to teach these men to kill without compunction and, if possible, get a little fun out of it.' Or again, another military officer, 'good citizenship is an excellent thing; and so are religion, filial affection and brotherly love. But they are not the ends of the army. An army exists to kill men when ordered, in the nation's quarrel, irrespective of its justice'.

From the point of view of the whole community, out of which belligerent groups are composed, the effect of war is entirely disruptive. For example the wars between England and Scotland, which were carried on intermittently for many centuries, may have served to provide situations favourable sometimes to the progressive organisation of society first on

one side of the border and then on the other. But there is hardly any single living person, who resides now in either country, who would regard a renewed outbreak of hostilities between the two communities as anything but unmitigated folly, which would obviously be disastrous to both. That is to say, what can appear to be normal for a small group is pathological for the larger inclusive group. Considered as an attribute of the human species as a whole, war is a disruptive phenomenon and, as such, can consistently be classified as an abnormal state of society. Until recently, there has been a general tendency, at least in Western countries, to look upon warfare as a normal ingredient of civilized life. This is indicated by the blatant assumption that it is natural for a country to have a war department with a minister for war. Since 1918, a gradual change of opinion appears to have been taking place. The view that war is a pathological state is now more generally accepted. Recently, scientific discoveries have been made, which enable large populations, and even large armies, to be destroyed in ways almost too frightful to contemplate. This knowledge carries with it a conviction of the fundamental unsoundness or unhealthiness of the use of warfare as a policy. Moralists and philosophers have failed to convince but new knowledge has basically changed the situation. There can now be very little doubt about the disruptive effect of warfare upon human civilization as a whole. As Dr. Brock Chisholm, Director-General of the World Health Organization, stated in 1949, 'We must discard warfare, as an obsolete behaviour pattern.' Its pathological nature being granted, the study of its natural history can be undertaken deliberately with a view to its prevention with the same energy that has been successfully applied to diseases like plague, cholera and tuberculosis.

It is easy to be obsessed by the physical aspect of war. The

topographical and quantitative problems which arise in the pursuit of war techniques are so fascinating to the student of military affairs, that he may forget that the whole process emanates from the peculiarities of human psychology. That human beings frequently organize themselves for the purpose of intraspecific conflict must be accepted as a fact. But it is as reasonable to treat the fact as material for the study of crowd psychopathology, as it is to examine the causes and effects of physical infectious diseases, like malaria, tuberculosis and syphilis, which have ravaged the bodies of men and women ever since the earliest times.

The problem of preventing warfare between sections of the human race, though of fundamental importance, presents great difficulties. The causes are extremely complex. According to Freud, civilized society is perpetually menaced by disintegration through the primary hostility of men towards one another. Yet the fact that stable civilizations have been able to develop, when they have not been in danger of being overrun by predatory neighbours, show that there are probably many satisfactory outlets for aggressive instincts other than the war behaviour pattern. Hostile disturbances within a stable community come into the category of crime. From the present epoch onwards, the world is so integrated by systems of communication and travel, if not yet by a federal government, that any major war must partake of the character of a civil war and any minor war naturally falls into the category of crime, with one or both belligerents as offenders against the whole human community. If this outlook is accepted, the problem of prophylaxis or treatment of belligerency is similar to that of the prophylaxis and treatment of crime in an organized society. In this field, statistical analysis has some scope as an aid to empirical legislators or psychologists. The amount of crime can be

measured and the conditions, which favour it or which tend to prevent it, investigated by noting local and general changes in incidence. According to this precedent, quantitative study of warfare seems therefore to have justification.

A most thorough analysis of the history of recent wars, from the quantitative point of view, was carried out by Quincey Wright. The standards applied to the history of European wars by Wright were as scientific and objective as those applied in epidemiology. Following previous workers, he measured the amount of disturbance by the number of casualties recorded, at the same time fully recognizing the sources of error in this method of approach. He was able, thus, to demonstrate certain regularities, which the usual qualitative historical treatment of these events tended to obscure. Major disturbances occurred at intervals of about one hundred years, with less severe disasters at the intermediate half-century points, which seemed to be readjustments. Taking the whole period of some 500 years, there might be said to be a 50 year cycle in European affairs with varying degrees of severity at different maxima. This length of period had been observed in ancient history by Spengler and attributed by him to the development of and subsequent loss of what I am now calling immunity. Unwillingness to repeat the same reaction pattern prevented a new disturbance until sufficient numbers of fresh generations, presumably lacking in immunity, had entered the population. The warrior, it has been said, does not wish to fight again himself and prejudices his son against war, but his grandsons are taught to think of war as romantic. Economic fluctuations also have been held responsible for the 50 year cycle and Wright indicated that there was no certainty that the same periodicity would continue now that Europe had become more closely connected with the rest of the world.

New internal political situations might also upset the rhythm.

On a much larger time scale, J. S. Lee has suggested that there are rhythmical processes to be detected in the disturbances recorded in the history of China. There were periodic civil wars at intervals of rather more than a century, but the whole detailed pattern also showed signs of repetition at intervals of about 750 years. Commenting upon this remarkable historical fact, Lin Yutang suggested population growth as one determining factor though he was inclined to give considerable weight to psychological factors as evidenced by rise and fall of cultural activities. These changes in culture he connected with alterations due to the gradual penetration from neighbouring peoples, of ideas such as Buddhism and the Mongol arts.

Attention can also be focussed upon the quantitative study, by other methods, of warfare between states. For instance, Richardson made a study of the relation of outbreaks of organized violence to population density and length of frontier. He argued that, since local government or national government could be shown by arithmetic to prevent internal conflict, world government could prevent wars altogether. Moreover, some very remarkable statistical facts concerning the psychology of preparation for warfare have also been analysed by Richardson. He pointed out, for example, that, if it were true that preparation for war tended to preserve peace or to insure a nation against war, there should be a strong negative correlation between the number of people killed in wars and the amount of money spent on armaments in peacetime for different countries. That is to say, a state which made little preparation might be expected to suffer heavier casualties in consequence of warfare than a state which was kept continually in a condition of high

military efficiency. Richardson showed that there was no appreciable correlation between preparedness and subsequent suffering in the first world war.

Another important point emphasized by Richardson concerns the dynamics of crowd behaviour; namely, the phenomenon of an armaments race. During the years 1909 to 1914, France, Russia and Great Britain, on one side, and Germany, Austria-Hungary and Italy, on the other, spent increasing amounts each year on war preparations. The condition of mutual threats and counter-threats produced a system in which both sides increased yearly expenditures in compound interest proportions. If the amount of national income spent on armaments is an index of the quantity of ideas, in the population, of fear and suspicion of potential foes, the arms race clearly represents a crowd epidemic in its phase of exponential increase.

Civilization, according to Hecker, is continually threatened with disintegration on account of propagation of suicidal delusions. However, it is also continually menaced by starvation and plague. The parallel study of warfare from the epidemiological viewpoint seems to offer some hope for the future. The vicissitudes of political upheavals, revolutions and wars appear, at first sight, to be quite unpredictable. In this they resemble the changes of the weather. Yet meteorological regularities do exist and it is possible now to make fairly accurate predictions based upon the knowledge of the behaviour and structure of cyclones, for example. The weather alters with the season of the year and so, curiously enough, does the likelihood of outbreaks of hostilities in human affairs. The French Revolution of 1789 exploded on 14th July with the storming of the Bastille. In 1870 Napoleon III was goaded into declaring war on Germany on the same day of the same month. The Germans,

however, did not attack until 2nd August. They selected 4th August for opening hostilities in 1914. In the second world war, the dates varied. The attack on Poland began on 1st September 1939, the assault on France on 10th May, 1940, and the attack on Russia on 22nd June, 1941. It is easy to rationalize these decisions on the basis of military or political considerations but the fact remains that many major disturbances in north-western Europe, during recent times, have begun in the late summer months. In common language, history really does tend to repeat itself.

The disasters of war also have some resemblance to the havoc wrought by earthquakes in that some localities are more prone than others to be affected. It is astonishing how Belgium remained the cockpit of Europe for centuries. Historians are inclined to consider the analysis of uniformities or repetitions of human behaviour as trivial and to regard the explanation of particular events as important. Only by the objective study of uniformities and repetitions can a dynamic numerical analysis of human history be achieved.

CHAPTER IX

THE TRANSMISSION OF IDEAS

(a) GENERAL PRINCIPLES

The study of fluctuations in the reactions of individuals in terms of the frequency of an idea in a given population has been likened to epidemiology, that is, to analysis of the behaviour of infectious crowd diseases. The discussion of the psychology of the transmitting processes has, however, been so far kept in the background because of the wish to make the account as objective as possible. For the same reason, I have found it undesirable and, indeed, unnecessary to postulate any particular herd instinct. It is a fundamental observation that the same individuals can have different reactions as members of different groups but this need not be explained by reference to special hypothetical sets of instincts. The whole of the dynamics of crowd behaviour, however, depend upon the phenomena of transmission of ideas and something must be said about them by way of conclusion. The treatment of the problem here is psychological and does not deal with the subject of communication engineering, or cybernetics, a study which may ultimately provide most useful information on the topic of crowd behaviour. To avoid misconception, it is probably necessary to add that at no point am I taking into consideration transmission of ideas by so-called parapsychological or extra-sensory mechanisms.

An idea can arise in the mind of a given individual on account of external experiences or internal stresses. Two people, who have the same experiences and who are similarly

constituted, may have many ideas in common even though they have never communicated directly. Dynamic crowd psychology, however, depends upon the transmission of ideas from one person to another.

(b) INFECTIOUS PROPERTIES OF IDEAS

The transmissibility of ideas depends upon three things, (1) the quality of the idea itself, (2) the available means of transmission, and (3) the condition of the recipient.

Some ideas are naturally much more infectious, more readily transmissible, than others. Moreover, special situations make the acceptance of new ideas by some individuals much easier than by others. A normal situation occurs in the development of reaction patterns in children. In the early stages, the child accepts the ideas of and copies the reactions of the parent in exchange for a sense of security. Later on, school teachers, persons in authority and leaders of various kinds are accepted as substitutes for parents and their ideas and reactions are copied. It is sometimes assumed that the processes of education and other forms of conditioning to civilized life are produced in a rather mechanical way. Association of ideas and Pavlovian conditioning, however, require the presence of an active basic instinct, such as hunger. As with crowd reactions, the dynamical processes of juvenile conditioning are based ultimately upon emotions rather than considered estimates of the value of the evidence.

In adult life, situations which recall or which represent the parent and child psychological relationship facilitate the transmission and acceptance of ideas. The extreme example of this is the hypnotic state and hypnotic suggestion but much commoner and more important is the reaction of crowds to religious or political leaders. To produce the idea

or feeling of security, the hypnotist or political leader must be absolutely certain of his infallibility or present a convincing façade. Methods used both in hypnotism, in dictatorship and in some religious ceremonies include shock and dazzle demonstrations. Mystery, secrecy and suspicion are characteristics of readily transmissible ideas.

The possible modes of transmission of ideas are extremely varied. Gestures are among the most primitive visual means. Auditory signs have been developed along with language. In civilized life the stimuli which alter people's thoughts and reactions are intertwined with so much subtlety that even the most successful exponents of propaganda theory and methods are only partly conscious of the means by which their effects are obtained. In modern times the radio has made exploitation of auditory methods more profitable than the visual stimuli of newspapers and posters partly on account of the rapidity with which reaction is produced and partly because of the personal element in the auditory stimulus. Cinematography can be used for complex simultaneous visual and auditory transmissions. The manner in which children's opinions can be altered by exposure to motion pictures with ethical implications has been investigated arithmetically by Peterson and Thurstone. It was found that new opinions upon social and political questions, thus induced, persisted over periods of many months. The effects of two or more demonstrations with similar bias were cumulative. Political propagandists, however, often find that extremely simple means are effective. Massive displays of colour, flags, emblems and large-sized portraits of celebrities all have their vogue. The Italian fascists were said to have increased their power among the peasants by painting large eyes upon walls. Such devices and many others have been described and discussed by A. B. White. Essentially the same methods

are used both by political parties and by commercial advertisers. The comparative study of the uses of these varieties of method is not part of the plan of this book. It is worth while to emphasize, however, that the quantitative estimation of the efficiency of these various methods for changing ideas in groups can be dealt with by carefully designed experiments.

Dissemination of new ideas is greatly facilitated if the community receiving them is relatively isolated. The importance of mental isolation engendered either geographically or artificially is outstanding. This was seen especially in the example of the Doukhobors and it is interesting to note that this particular group is still isolated and has caused much trouble in recent years by an epidemic of nudism which has hardly yet reached a quiescent stage. Ideas of suspicion are especially likely to develop in people who are isolated from the rest of the community. Like many dynamic processes in crowd psychology, the development of ideas of suspicion is self-perpetuating. The more mutual the suspicion, the greater the tendency to mutual isolation and thence even more favourable ground for the further growth of ideas of suspicion. An example, on the international scale, is the mutual paranoia which produces an armament race.

(c) PATHOLOGICAL IDEAS

The distinction between normal and pathological ideas in the individual is recognized by psychiatrists. Certain peculiarities of behaviour and the attendant verbal expressions are characteristic of disordered or diseased minds and these have been classified and investigated very fully. They range from minor disturbances such as 'active' forgetting to extreme confusion. The test of an idea from the psychiatric point of view is commonly said to be whether or not it

is sensible or rational—that is, it can be established as true by reference to reality or, if it is a mistake, it corresponds to a usual type of error. An erroneous or irrational idea, however, may be held by all or a great majority of the members of a group without making them individually of disordered mind. The converse is often true also. The person who stands out as having a different idea from the rest of the community is often considered mentally peculiar even though his idea should eventually turn out to be correct.

It is a characteristic of the mentally ill that they are out of touch with the rest of the community and with one another. On the whole, the capacity to share the delusions of the crowd is a sign of individual health. This curious paradox makes it difficult to define crowd psychopathology in the same terms as individual mental illness. The compromise I have suggested is to regard, as pathological for the crowd, ideas which are disruptive from the point of view of the largest group under consideration. The concept is a relative one until the group considered is the whole human race. Irrespective of objective truth and falsity, the beliefs of an individual are considered abnormal, if they differ from those usual in the society in which he lives. A small group can similarly appear abnormal in a large community or nation, and national aims would be presumably, by the same token, abnormal if they were out of harmony with those of the rest of the world. It is difficult to define quantitatively the limits of normality. It might be considered that an idea held by five per cent. or less of the community in opposition to 95 per cent., who hold a different idea in common, constituted abnormality. An opposition consisting of 30 per cent. or 40 per cent, has a good chance of succeeding sooner or later in converting a majority of the community and thereby making their idea the usual one. It does not seem possible,

however, to define normal and pathological ideas purely in terms of frequency.

Although people who are mentally disturbed are usually insensitive to the opinions of the rest of the community sometimes they are carriers or purveyors of ideas of an extremely infectious kind. In certain situations, ideas emanating from such persons become widely distributed. Hallucinations are not very infectious ; it is difficult, though not impossible, to persuade people to misinterpret sense perceptions. Abnormal enthusiasm and excitement as well as the mood of depression can be conveyed from person to person along with ideas related to these moods but the changes induced in the recipients tend to be of short duration.

By far the most infectious abnormal ideas are so-called 'paranoid' delusions. In classical psychiatry, these form part of the symptomatology with certain definite classes of patients. Kraepelin drew attention particularly to one group of paranoiacs, the prophets, saints and mystics as they were called, who had visionary or ecstatic experiences. 'The patient sees in the night divine manifestations, and experiences at the same time an indescribable blissfulness ; he hears the voice of God, receives orders from him : he sees the devil as well, Christ appears, at the same time a voice rings out, "feed my sheep". God calls out to him, "you are the only one"'. Or the patient may set out to write a book discussing the most important truths. 'The naive view of future magnificence, which appears in these documents, returns frequently in the formation of sects and in religious foundations. It can be easily understood that paranoid patients of the kind here described have not infrequently become the founders of large communities.' There is another brand of paranoia, however, which is less benign and un-

fortunately equally infectious. A patient with this type of disease believes himself to be the centre of a plot against him. 'All his misfortunes are attributed to the evil influence of those who wish to destroy and torment him. These persecutions are sometimes thought to radiate from a single individual, a member of his family, his employer or some politically notorious person of whom he reads in the newspaper.' The patient incorrectly interprets actions of others as having special significance for himself.

If the imaginary persecutors are numerous, they usually are supposed to be organized secretly. It is impossible by argument, force or persuasion to convince a paranoid patient that he is mistaken in his views. His delusions are logically based upon his own experiences but they are interpretations which seem improbable to an observing physician. This fact may convince the patient that the physician is in league with his persecutors. The paranoid system utilizes many circumstances from real life in its construction. Societies with secret rituals, like the Freemasons or the Ku-Klux-Klan, or maybe the Jews or the communists, are credited with specific designs for ruining the patient. A clever paranoid can concoct a story so consistent and superficially plausible that the separation of delusion from common sense proves very difficult. Not infrequently a patient of this type, living in the general community, behaves in a manner which creates a good deal of natural antagonism among relatives, neighbours and business associates. In this way, to some extent such a person makes his delusions real. In so far as he can achieve this, he avoids being mentally sick himself because he is actually persecuted. His position is strengthened if he can persuade some one else to accept his point of view. The more proselytes he can muster, the more certainly he can feel that his view is the only possible one. Some patients succeed

in obtaining the services of efficient lawyers to support their cases against those who consider them insane.

The common property of paranoid ideas is an implied overvaluation of personal experiences, a desire to be loved and sought after by others coupled with emotions, contempt and hatred, and suspicion of the opinions of others and devaluation of them as personalities. The subject who harbours such thoughts often acts in a way calculated to make conditions in his environment correspond with them. He can infect others with his ideas but is himself immune from being influenced by persuasion. The person whom he infects is similarly immune to argument, on the topic concerned. For this very reason, a crowd infection with paranoid ideas proves to be one of the most intractable forms of mental epidemic. The insidious penetrating power of this type of delusion is matched only by its obstinacy. According to Freud's view, the impulse behind paranoid delusions is repressed sexuality, in particular, the homosexual component of sexuality. To this factor we may attribute the cohesive force which binds together the members of the same sex into groups which follow a paranoid leader.

(d) THE CONDITION OF THE RECIPIENT

The preparation of the soil in which the seeds of political, national or religious ideas are to be sown is also a matter of moment. Certain types of responsiveness are common in childhood or in adult life and these can be enhanced by suitable training. Obedience to the commands of authority, which reaches one of its most extreme forms in military discipline—'theirs not to reason why, theirs but to do and die', resembles the phenomenon of hypnotic suggestion. The hypnotized subject reacts unconsciously as though he were a helpless infant biologically dependent upon an infallible

parent. It is relevant here to recall the observation of Rivers who, when speaking of his experiences in the first World War, remarked that soldiers are much more easily hypnotized than are civilians. The suggestibility of the private soldier, he maintained, was especially enhanced by military training and military duties directed towards the perfection of collective activity. A state of mind favourable to hypnosis can also be brought about by a variety of technical devices, well known to experts, all of which emphasize the omnipotence of the operator. For this purpose either the appeal to a sense of perfect security (sleep induction) or the mobilizing of a primitive fear of the unknown (induction by shock) is found to be effective. Similar methods of inducing receptivity are not only used by charlatans, like fortune tellers and purveyors of secret remedies, for commercial purposes, they have become an integral part of the technique of the preparation of masses of people for revolution or war.

There are other considerations which should also be touched upon here, especially because quantitative treatment may help in their understanding. Though the people of the world are all human and belong to the same species of animal, there are inborn genetical differences within groups and between groups. Many of these differences are exaggerated by environment but hidden distinctions remain. Between any two crowds, however they are built up, there will be different frequencies of genetical units. Now, I do not propose to suggest that any ideas in the sense used in this study are themselves inborn structures. But it seems likely that predisposition to accept one idea rather than another may be determined partly by inborn factors both chemical and structural. It is a commonplace to observe that one person can accept an idea in mathematical form whereas another

cannot. One may willingly accept an idea expressed in poetry whereas another will not. Furthermore, one person may, in response to certain stresses, develop a paranoid reaction whereas another will not. Some people may be, by their nature, more credulous than others. There are also significant differences between men and women with respect to the ideas most likely to appeal to them, as shown in the elaborate study of Terman and Miles on male and female preferences. The level of understanding of the population has to be taken into account by propagandists. And some of the variation of intelligence level is undoubtedly attributable to the genetical properties of the population concerned.

The distribution of the intellectual capacity is such that, in order to influence more than half the population, propaganda must be expressed in a form which can be understood by people of sub-average intellectual ability. The simpler the slogan, the more readily will it be accepted by a majority. Failure of excellent policies for improvement of the status of electorates may have been too often due to the difficulty of people's appreciating what can only be expressed in relatively complicated language.

It is not to be supposed that inborn differences between members of groups of people are likely to be major factors in most examples of crowd behaviour. Far more significant is previous experience, in the form of mode of life, education and general knowledge. It must, however, be admitted that there is very little scientific evidence bearing directly on this question. Investigation, too, would meet with serious difficulties. For example, it could easily be shown that Christian protestantism and catholicism were familial traits. So also might be conservatism and communism. This finding would not prove that there was any genetical cause of attachment to these ideas unless the same effect were found when different

members of the same families were nurtured entirely at random.

The ideal situation, to which at the present time there are many approaches in different countries, all still very distant, would be reached when people were only convinced by facts and were continually demanding more information before forming judgments on policies of all kinds. To achieve such an end, in which immunity against all pathological ideas was the rule, a main objective of education would have to be the inculcation of an attitude of scientific scepticism. In view of the very large number of people in the world, whose opportunities for education are minimal or non-existent, the magnitude of the problem of crowd mental illness prophylaxis by this suggested means is considerable. One of the most important factors predisposing to disruptive epidemics is isolation. Education, in the widest sense of spread of human knowledge, is a powerful antidote to this predisposing factor.

CHAPTER X

CONCLUDING REMARKS

The analysis presented in this essay has been for the most part a sketch of the main lines in which arithmetical methods might perhaps be usefully employed in the study of human crowd behaviour. Starting with the conception of an individual with a particular reaction pattern as a unit, an attempt has been made to show how quantitative measurement in this branch of psychology can be carried out logically and systematically. The chief difficulty throughout has been to find trustworthy examples in existing records, which could serve as bases for quantitative studies. This defect would seem to be partly due to a lack of appreciation among investigators of the significance of quantitative details such as the numbers of people involved in groups and the exact time schedule of events.

Most previous studies of crowd behaviour have dealt exclusively with processes, or dynamic aspects as I have called them. Changes in opinion and in reactions can be dramatic and can attract the attention of observers. There are, however, as I have tried to point out, some important characteristics of static systems, that is to say, groups in which changes of opinion may be looked upon as random fluctuations. Certain statistical properties of crowd behaviour depend only upon the size of the group concerned. Thus, it has been shown that, if factors other than size are neglected, large populations are relatively more easily controlled or governed than small groups of people. The advantages of hierarchical or stratified systems, from the point of view of economical control, can be explained on similar grounds.

These considerations, I feel, should influence political philosophers in their estimates of efficient, equitable or desirable methods of government and they may be of significance also in the understanding of history.

The unit of measurement introduced to help in the numerical analysis of crowd dynamics requires some comment. The concept of an individual with a given idea or reaction pattern was used provisionally and deliberately without precise definition because of the absence of any previously standardised tool. The decision as to whether an idea was to be regarded as conscious or unconscious was shelved. Moreover, apart from insisting that ideas are real, I have avoided distinguishing between their subjective and objective aspects. As Haldane suggests in his discussion of Marxist philosophy, if confusion of the subjective and objective should lead to contradiction in psychology, the resulting clarification of concepts might be advantageous. One definite property of the *ideas* discussed here is that they are supposed to be acquired and not inborn characteristics of the individual.

The empirical methods adopted in this study may have succeeded in avoiding unprofitable philosophical discussion but they nevertheless leave some awkward logical questions unanswered. A perplexing problem concerns the difference between ideas which are valid or correct and those which are delusions or phantasies. Certain types of untruths are more readily accepted than are well substantiated beliefs. This fact is known to be connected with the uncritical, ignorant and yet receptive nature of the infantile mind. The soundness or truth of an idea appears thus to be a matter of degree and a function of the quantity of human experience which it summarizes.

While recognizing these methodological difficulties it has been possible to point out some natural regularities in crowd

behaviour from which some general rules can almost be deduced. It appears that predisposing causes for disruptive crowd disturbances are ideas associated with mystery, grandeur or suspicion to which people isolated by ignorance are exposed. An example would be the indoctrination of German youths with the idea of Aryan race superiority. The description of the growth and decline of prevalence of ideas in populations in terms of epidemics, analogous to those of infectious diseases, is convenient. Analogy with chemical reactions might have been closer in some respects. The important point is that these processes take place and require to be understood. The development of immunity to ideas, though capable of being described in other ways than I have adopted, is an important social phenomenon.

Most readers will be acquainted with better examples of crowd behaviour than I have been able to present and they are likely to have drawn quite different conclusions from the evidence. The subject is, however, an important one and too little attention has been paid to the arithmetical data. The quantitative approach, though it may seem superficial in many respects, has the advantage over more traditional methods of social enquiry that it lacks political or national bias. One of the causes of mental unrest in the world at the present time is a growing awareness among members of the human race of the vast extent of their own population. Thus it seems appropriate to pay attention to the reactions of crowds which are specially connected with or determined by the numbers of people they contain.

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APPENDIX

FURTHER NOTES ON THE SQUARE ROOT SYSTEM OF AWARDING VOTES

One of the advantages of awarding to each country a number of votes, proportional to the square root of its population or its electorate, is that its voting power will then be almost independent of the way in which the other countries are distributed with respect to population size. Thus, it is immaterial from the point of view of the voting power of one country if another country divides into several independent states or if several states coalesce into one. This conclusion is based upon the following considerations.

(i) When groups, which form voting blocs, are of different sizes they can still be regarded as a set of blocs of the same size or a set of fictitious single voters. The relationship is as follows.

Let $a_1, a_2, a_3 \dots a_u$ represent a set of u blocs containing a_1, a_2 , etc., votes each and voting at random. This set is equivalent to N blocs of equal size with

$$a_N = (a_1^2 + a_2^2 + a_3^2 + a_4^2 + \dots + a_u^2) / (a_1 + a_2 + a_3 + \dots + a_u)$$

votes each.

For,

$$N = (a_1 + a_2 + a_3 + \dots + a_u)^2 / (a_1^2 + a_2^2 + a_3^2 + \dots + a_u^2) \\ = [S(a)]^2 / S(a^2).$$

(ii) The power, Pa_N , of a single bloc in an assembly of N blocs of equal size, a_N , is comparable with that of a single vote in an indifferent community. The power of a vote, Pa_N , is defined as the chance of using the vote (see p. 11) to influence a decision. When the number of blocs is large,

$$Pa_N = \sqrt{2/\pi N}.$$

(iii) The power, Pa_1 , of a bloc, differing in size from a_N as regards number of votes, is $a_1 Pa_N/a_N$ provided that N is large with respect to a_1/a_N .

(iv) In an assembly composed of blocs with different numbers of votes, the power of any bloc with a_1 votes is determined thus, using (iii) and (ii),

$$Pa_1 = a_1 Pa/a_N = a_1 \sqrt{2/a_N} \sqrt{N\pi}.$$

(v) Since $a_N = S(a^2)/S(a)$ and $N = S(a)^2/S(a^2)$ from (i),

$$Pa_1 = a_1 \sqrt{2/\sqrt{\pi S(a^2)}}.$$

(vi) Thus, if a set of countries are awarded votes according to the square roots of the sizes of their populations, their voting powers will depend only upon the total population, $S(a^2)$, from which all countries are drawn, upon a constant, $2/\sqrt{\pi}$, which is nearly unity, and upon the number of votes awarded, a_1 . This assumption is very accurate for small countries and the error is unimportant even for a country comprising up to one fifth of the total world population.

(vii) The power of any individual's vote in any given country is $\sqrt{2/\pi a_1}$. If each country is represented by a bloc proportional to $\sqrt{a_1}$ in the world assembly, each person's power of influencing a decision there is the same, namely

$$\sqrt{2/\pi a_1} \times Pa_1 = 2/\pi \sqrt{S(a^2)}.$$

It is interesting to examine the effect of using the square root system for a world assembly. The list of countries which follows includes nearly all units which are actually represented in the United Nations or which might at some time become independent members. The populations are based for the most part upon 1947 estimates and they are given in millions. The square roots of these numbers give the precise voting power, which could logically be awarded to each country. For purposes of simplicity the suggestion

is made that the actual votes awarded could be expressed as integral numbers, any fraction counting as unity.

There are 90 countries in the table and, if each were to have only one vote, they would all be equally powerful; here $P = \sqrt{2/90\pi} = 8.4$ per cent. At the other extreme, a *per capita* system of awarding votes, one per million inhabitants, would lead to an assembly equivalent to a committee of 12 and would make the contributions of the smaller nations insignificant. One million inhabitants would have a voting power of only 0.12 per cent.

The intermediate square root system leads to an assembly equivalent in voting possibilities to a committee of 49 or 55 independent individuals according to whether fractional votes are allowed or not. In either case the voting power of a country with one million inhabitants is 1.6 per cent. and just reasonably effective. The total number of votes in the assembly would be large enough for it not to be unduly dominated by the largest countries, China, for example, having only 6 per cent. of all the votes but 20 per cent. of the total population. Provided that each country votes independently it makes no appreciable difference to the voting power of any one country how the remaining votes are distributed since the sum of the squares of all votes is proportional to the total world population. The power of one resolute person to influence a decision in such a world assembly is the same as that of any other, namely about one in 70,000.

A somewhat similar effect could be produced if two votings were required for every decision, one on a *per capita* basis and the other upon the basis of a single vote for each country. This system, however, would be inaccurate in that it would tend to favour very large countries.



LIST OF COUNTRIES AND VOTES

<i>Country</i>	<i>Millions in Popula- tion</i>	<i>Square Root</i>	<i>Sug- gested Votes</i>	<i>Country</i>	<i>Millions in Popula- tion</i>	<i>Square Root</i>	<i>Sug- gested Votes</i>
Algeria	8.488	2.9	3	Lebanon	1.179	1.1	2
Congo	11.740	3.4	4	Malaya	4.908	2.2	3
Egypt	19.179	4.4	5	Mongolia	2.000	1.4	2
Equatorial Africa	4.131	>2.0	3	Nepal	6.450	2.5	3
Ethiopia	15.000	3.9	4	Pakistan	72.206	8.5	9
Gold Coast	3.715	1.9	2	Philippines	19.511	4.4	5
Kenya	4.200	>2.0	3	Syria	3.000	1.7	2
Liberia	1.600	1.3	2	Saudi Arabia	6.000	2.4	3
Morocco	8.225	2.9	3	Siam	17.351	4.2	5
Nigeria	23.745	4.9	5	Turkey	19.250	4.4	5
Sudan	7.919	2.8	3	Yemen	7.000	2.6	3
Tanganyika	5.650	2.4	3	Albania	1.154	1.1	2
Union of South Africa	11.605	3.4	4	Austria	6.920	2.6	3
West Africa	15.996	<4.0	4	Belgium	8.421	2.9	3
Canada	12.582	3.5	4	Bulgaria	7.048	2.7	3
Costa Rica	0.787	0.9	1	Czechoslovakia	12.164	3.5	4
Cuba	5.091	2.3	3	Denmark	4.146	>2.0	3
Dominican Rep.	2.151	1.5	2	Finland	3.895	<2.0	2
El Salvador	2.047	1.4	2	France	41.000	6.4	7
Guatemala	3.642	1.9	2	Germany	67.300	8.2	9
Haiti	3.550	1.9	2	Greece	7.550	2.7	3
Honduras	1.240	1.1	2	Hungary	9.093	>3.0	4
Mexico	23.434	4.8	5	Iceland	0.134	0.4	1
Nicaragua	1.135	1.1	2	Eire	2.972	1.7	2
Panama	0.729	0.9	1	Italy	45.373	6.7	7
U.S.A.	144.034	>12.0	13	Luxembourg	0.289	0.5	1
Argentina	16.912	4.1	5	Netherlands	9.629	3.1	4
Bolivia	3.854	<2.0	2	Norway	3.144	1.8	2
Brazil	47.550	6.9	7	Poland	23.781	4.9	5
Chile	5.526	2.4	3	Portugal	8.312	2.9	3
Colombia	10.545	3.2	4	Rumania	16.530	4.1	5
Equador	3.400	1.8	2	Spain	27.503	5.2	6
Paraguay	1.225	1.1	2	Sweden	6.803	2.6	3
Peru	7.922	2.8	3	Switzerland	4.547	2.1	3
Uruguay	2.000	1.4	2	U.K.	49.539	>7.0	8
Venezuela	4.398	2.1	3	Yugoslavia	15.752	4.0	4
Afghanistan	12.000	3.5	4	Australia	7.581	2.8	3
Burma	17.000	4.1	5	New Zealand	1.802	1.3	2
Ceylon	6.879	2.6	3	U.S.S.R.	156.472	12.5	13
China	463.198	21.5	22	Byelorussia	5.568	2.4	3
Hongkong	1.750	1.3	2	Ukraine	30.960	5.6	6
India	338.727	18.4	19				
Indochina	27.030	5.2	6	Totals (90)	2,261.568	334.5	381
Indonesia	76.360	8.7	9				
Iran	17.000	4.1	5	Sum of Squares	415,396.0	2,261.6	2639
Iraq	4.800	2.2	3	N	12.3	49.5	55.0
Israel	1.940	1.4	2	Power of Unit Vote, ex- pressed as %	0.12	1.68	1.56
Japan	78.000	8.8	9				
Korea	27.700	5.3	6				

Square
Root

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11 2
22 3
14 2
26 3
86 9
44 5
17 2
24 3
42 5
44 5
26 3
11 2
16 3
9 3
7 3
5 4
9 3
2 2
7 3
9 3
3 3
4 4
1 1
2 2
7 3
1 1
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2 2
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