later, when the war was over, the patient sought out Dr. Worster-Drought, and among various threats accused him of ruining his life by causing his certification; he said that not for one moment had he ever intended to commit suicide, but that he had merely acted the part to escape military service. Some months later, however, he was again certified by other physicians, and was still in a mental hospital.

Dr. Worster-Drought considered that a defect in our social system was that between the general hospital and the county mental hospital there were no institutions to which a patient of the so-called "pauper" class could be admitted. The general hospital was not suitable for, and

usually did not admit, either borderland cases or those suffering from the milder forms of insanity; there was no other course but certification. Some cases were admitted to the special hospitals for nervous diseases, but these institutions did not really desire such cases, nor were they entirely suitable. What to do with the mild and borderland cases whose means were slender and those of the hospital class was an ever-recurring problem. The position could be met only by the foundation of special institutions similar to the Maudsley Hospital, or by the admission of voluntary boarders to the county mental hospitals; the latter course, however, was not without its objections.

A COMPARISON OF THE EFFECT OF THE LONDON CLIMATE ON CAPTIVE ANIMALS AND MAN.

BY

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It had long been felt that there was some correlation between the weather and the number of deaths occurring among the animals living in the Zoological Society's Gardens, but there had never been any attempt to work out the actual figures. This was probably due to the difficulty of obtaining accurate figures of the climatic conditions prevailing in the neighbourhood of the Gardens; the figures derived from Kew naturally would not apply. However, from 1919 records have been kept at the Royal Botanic Society's Gardens, and as these are situated within half a mile of the Zoological Gardens, it would appear that these could be applied to the Zoological Gardens without introducing any serious error. I wish here to acknowledge my indebtedness to the curator, Mr. J. L. North, for the loan of all his records, which has made this analysis possible.

In view of the larger numbers of small birds kept in the Gardens, and the frequent difficulty in giving an accurate diagnosis of the cause of death, it was not justifiable to attempt to work out figures for birds. The conditions prevailing in the Reptile House also seemed to place the inhabitants somewhat outside the influence of the weather. It was resolved, therefore, that only mammalian deaths should be examined. For this purpose all deaths due to accident or the attacks of cage companions were excluded. The atmospheric conditions which appeared to have a bearing on the matter were the following:

1. Maximum temperature in the shade. The temperature in the shade was selected because all the animals have an opportunity to get into the shade should they wish it.

2. Minimum temperature of the air. This was chosen rather than minimum temperature of the grass, for the reason that in cold weather all the animals have a shelter—not necessarily heated, but enough to keep them from the extreme of ground temperature. The warming of houses would seem to introduce a fallacy in the use of external temperatures, but in most cases a change of external temperature, if of any magnitude at all, affects to some extent the level of temperature in the houses.

3. The total rainfall per month.

4. The number of days per month in which the wind blew from the quarter between the north and the east. This was included because it had been observed that the number of deaths seemed to increase when the wind was in that quarter.

5. Total sunshine per month.

6. The number of days per month on which fog occurred.

7. Percentage of moisture in the atmosphere, saturation being taken as equal to 100.

8. Total deaths per month.

9. Total deaths from pulmonary diseases other than pulmonary tuberculosis.

Further, it was felt that it would be of considerable interest to show a comparison between the deaths of the higher and lower mammals. Figures were taken from the deaths occurring in the Borough of Marylebone, excluding those due to accident or suicide. Also a chart is given here for pulmonary disease in the same area. Marylebone was chosen as being the borough in which the greater part of the Gardens is situated. For these figures I have to thank

Dr. Charles Porter, B.Sc., medical officer of health for Marylebone.

A short explanation is also required of the charts themselves. The four years taken are 1920, 1921, 1922, and 1923. These are indicated by the vertical black lines. Each of the twelve black dots in the division represents a month. The numbers are totals except in the charts of humidity and temperature, when the monthly number is the mean of the daily readings for that month. The monthly figures for the four years then added together and divided by 48 give the mean for the four years, which is indicated by the horizontal black line running the length of each chart. If the charts are then placed vertically in order, with the vertical black lines corresponding, the deviations from the mean occurring in each month can be read with ease.

Turning first to the charts of total deaths in the Gardens, it is seen that the number of deaths is, as a rule, above the average in January, and then falls gradually, with a rise in June and July, after which it falls, to rise again in the late autumn. There is not, however, any great regularity. Yet it can be said that the months of August and September are the healthiest.

There is one year which is worthy of special note—namely, 1921. This was a year in which there was a remarkably fine spring, summer, and autumn. The monthly total of deaths is below the average through a larger and more unbroken period in the year than is shown in any of the other years. In fact, the only months in which the total is above the average are July, November, and December, and in November it is only just above—that is, 23 as compared to 22.5. That July, which was the hottest and sunniest month of the year, should be the month with the highest number of deaths—namely, 27—may appear remarkable, but the drought brought with it a great deal of dust and also tended to cause decomposition of food, with attendant diseases of the alimentary tract.

Human mortality, on the other hand, was not unusually low during 1921. The monthly total of deaths was only below the average during six months, and in December it reached a total only second to that of January, 1922, which was the following month. Another reference will be made to this later.

The pulmonary disease charts of animal and human show a much closer relationship, and both run in a more regular fashion. There is a rise in November and December which reaches its highest point in January. It falls during the spring, to remain at its lowest during June, July, August, and September. The year 1921 shows an abnormality, which is especially marked in the animal deaths. Here the monthly deaths for the first ten months of the year were all below the average, while those for November and December were only 9 for each month, the average being 7. On the other hand, the human deaths only showed five months with totals below the average.

Having pointed out that these rises and falls exist, it is now appropriate to examine the other charts and to see what deviations from the normal can be found to have existed during those months in which there was a deviation from the normal in the death totals.

Probably the first condition to occur to the mind of the investigator with regard to climate and the deaths of exotic animals is temperature. As would be expected, the two charts of maximum and minimum temperature correspond

very closely. When the mean monthly maximum drops, the minimum follows it, although there is one striking difference, which is that the deviations from normal for the maximum are far greater than those of the minimum. The former ranges from 43° to 80° F., while the latter only ranges from 35° to 58° , so that the range of the one is more than twice that of the other. The greatest deviations of minimum temperature occurred in February, 1921, and January, 1922. In February, 1921 (temperature 36°), the

total deaths were 13—that is, 9 below the mean; while in January, 1922 (temperature 35°), the total deaths were 38—that is, 16 above the mean. The deaths from pulmonary disease were 3 below and 12 above respectively. The figures for Marylebone were exactly average—that is, 110 for February, 1921; while for January, 1922, they reached 270—that is, 160 above: The pulmonary deaths were 7 and 30 above the average in these two months.

These figures have been chosen as examples, but it can be seen from examination of the charts that the death figures and those for temperature do not correspond. It is true that in the warm summer months the deaths are fewer

than in cold winter ones, but, as the example taken shows, in two months in which the average monthly minimum temperature differs only by one degree, the difference in the death totals is very marked.

There is another aspect of temperature which might easily be considered responsible for a large number of the deaths among exotic mammals: this factor is the rapid changes in temperature from day to day, the existence of which, in the English climate, is a byword. To examine this a chart was made of the daily temperatures, maximum and minimum, for two years, and beneath it a chart of the daily deaths. In spite of the fact that a drop in temperature of 10° in twenty-four hours was a by no means uncommon occurrence, the death rate seemed absolutely unaffected by such changes. In fact, the one had so little bearing on the other that there was no need to reproduce any of the charts. It is not unnatural that this should be so, when the conditions in many semi-tropical parts of the world are considered, where the fall of temperature at sunset is far greater and more rapid than it is here. It is necessary, therefore, to search elsewhere for a cause; and the next points to examine are rainfall, humidity of the atmosphere, and the direction of the wind.

It will be simplest to compare in tabular form the two months which were previously used to point out the small influence of low temperature when considered alone. These months were February, 1921, and January, 1922.

	February, 1921.	January, 1922.
Total deaths	10 below normal	16 above normal
Pulmonary deaths	5 below ..	12 above ..
Total human deaths	Normal	80 above ..
Pulmonary human deaths ...	7 above normal	30 above ..
Humidity	5% above ..	11% above ..
Days of wind N. to E.	7.5 above ..	1.5 below ..
Total rainfall	1.8 in. below ..	0.7 in. above ..

This is a very nearly perfect example of the importance of a reasonably dry atmosphere in health. The only point in which there is a failing is that there were fewer days of northerly and easterly winds in January, 1922, than in February, 1921, but, as will be shown later, these unfavourable winds appear only to have influence when accompanied by rain. It is interesting to note that the maximum temperature of February was only two degrees higher than that of January.

Choosing the deviations in another way, December, 1920, provided the greatest total of animal deaths during the four years, and also the greatest total of pulmonary deaths, while October, 1922, gave least in total deaths and a very small pulmonary aggregate.

	December, 1920.	October, 1922.
Total deaths	30 above normal	17 below normal
Pulmonary deaths	16 above ..	5 below ..
Total human deaths	10 above ..	10 below ..
Pulmonary human deaths ...	12 above ..	3 below ..
Humidity	9% above ..	1% below ..
Maximum temperature	16° below ..	1° below ..
Minimum temperature	6° below ..	2.5° above ..
Days of wind N. to E.	7.5 above ..	7.5 below ..
Rainfall	0.5 in. above ..	3.6 in. above ..
Sunshine	90 hrs. below ..	40 hrs. below ..

Contrasting these two opposites, it can be seen that in December the weather was unduly cold, and there was much northerly wind. There was only a slight excess of rain over the normal, yet the humidity was 9 per cent. above the normal. In October, a favourable month, the minimum temperature was above the normal, and the maximum only slightly below it. The days of northerly winds were as much below the average as above it in the other month, but

the total rainfall was tremendous, and the humidity 1 per cent. below the normal. This would support the argument that rain without cold winds is harmless, while the converse also applies. The human deaths correspond also, but, owing possibly to the different modes of life of acclimatized humans and unacclimatized wild animals, the difference is not so marked.

Looking at the problem from the point of view of the average number of deaths in a month, July, 1920, has been chosen as showing an exact average total of deaths, and it is notable that there is no great deviation of wind, rainfall, or humidity, and that the deviations of the two former balance each other.

JULY, 1920.			
Total deaths	...	...	No deviation
Pulmonary deaths	...	...	4 above normal
Total human deaths	...	...	20 below
Pulmonary human deaths	...	...	5 below
Humidity	...	...	1% above
Maximum temperature	...	...	10° above
Minimum temperature	...	...	10° above
Days of wind N. to E.	...	...	5 days below
Rainfall	...	...	1.9 in. above
Sunshine	...	...	20 hours above

There are two more factors which must be considered—namely, fog and sunshine. With regard to the former, one cannot help feeling that, in Regent's Park at all events, the prevalence of fog was not really very great in these four years. There have been only forty-one days on which fog has occurred in the whole of them, and on very few of these has the fog persisted throughout the day. It is true that the number of deaths is greatest in those months in

which as a rule fog occurs, but rain and north-east winds are also prevalent then, and in a much greater degree. Of much greater importance is sunshine, or rather it is to be feared the absence of it, for the daily average of sunshine is but three hours out of the twenty-four. In the winter months it is approximately one hour a day. It is unnecessary to discuss here the action of sunlight in the prevention of disease. That it plays a very important part is now generally accepted. There is, however, one point which will bear emphasizing, as being new, and that is a possible difference in the effect of sunlight on man and animals. To see this it is only necessary to look at the charts for sunshine and human and mammalian deaths for 1921. Reference has already been made to the good health of the animals during this year, but, whereas the total of deaths remained low among the animals in November and December, among the humans the total for the same months rose to a great height. In fact the number of deaths in December was the second highest recorded in the four years, the largest being that of the January following. It would appear, therefore, that the lower mammals might be capable of storing up the sunlight and using it to increase their disease-resisting powers more satisfactorily than can the human.

The period over which these statistics extend is somewhat too short for any very strong conclusions to be drawn, but they are certainly suggestive of the two following:

1. That a dry cold atmosphere is not harmful, nor is a warm moist one; but a cold damp atmosphere is most deleterious both to the higher and lower mammals.

2. That while sunshine is beneficial to both, it would apparently have a more lasting effect on the lower mammals.

REMOVAL OF PART OF A SAFETY-PIN FROM THE BRONCHUS OF A CHILD BY PERORAL BRONCHOSCOPY.

BY

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THE following case illustrates the relative absence of signs and symptoms which is almost characteristic of the aspiration into the air passages of a metallic non-obstructive foreign body.

Peter C., aged 2 years and 10 months, had been playing with a damaged safety-pin on May 18th, 1924. The mother noticed that he had a slight attack of coughing lasting only a few moments, and she was unable to find part of the safety-pin. Little more was thought of the matter, for there were no further symptoms beyond a slight loss of appetite, but after three or four days a very slight cough developed, just sufficient to give the mother a little uneasiness and cause her to consult the doctor, who, even in the absence of physical signs, fortunately decided to send the child to hospital for an x-ray examination.

The child was admitted to the Royal Alexandra Hospital for Sick Children, Brighton, on May 24th; the honorary radiographer, Dr. Barrington Prowse, reported on the same day the presence of part of a safety-pin in the right bronchus. It was lying obliquely at the level of the second to the fifth dorsal vertebra, safety-catch downwards, and tilted one inch from the

middle line; the spring and pin portion were fortunately missing.

The child's condition was normal apart from a slight occasional cough, and the only physical sign present, and that an equivocal one, was a trace of deficient expansion on the right side.

On May 25th the child was starved of fluids for five hours and given 1/200 atropine in order to keep the bronchus as free as possible of secretion. Under chloroform anaesthesia the larynx was exposed with a laryngeal spatula through

which a 5 mm. bronchoscope was passed into the trachea. The upper end of the pin, not yet blackened, was seen just above the carina, and was grasped with slender Paterson forceps. A little manipulation served to release the impaction of the safety-catch, which was caught on the junction of the upper-lobe bronchus, and the pin was then withdrawn, together with the bronchoscope, to the level of the rima glottidis, into the axis of which it was rotated, and then removed. The bronchoscope was in use for four minutes, and no post-operative oedema developed. For four days there was slight hoarseness, and the child left the hospital in a week.

An experience such as this emphasizes the need for vigilance in dealing with cases in which the presence of a foreign body is suspected, whether or not presenting symptoms, and the advisability of a radiogram in all cases. It also emphasizes the fact that peroral bronchoscopy is a satisfactory means of dealing with

Radiogram of part of safety-pin in right bronchus.

such cases, which should completely supplant the older method of bronchoscopy through a tracheotomy wound.