EFFECTS OF WEATHER AND CLIMATE ON MENTAL PROCESSES IN MAN

POSSIBLE PHYSIOLOGICAL MECHANISMS INVOLVED AND THEIR SIGNIFICANCE FOR PARAPSYCHOLOGY

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INTRODUCTION

In order to study the physiological mechanisms involved in mental processes during the manifestation of parapsychological phenomena, different approaches are at our disposal. A direct experimental approach is the use of drugs which reduce the activity of certain parts of the brain and the study of the effect of this locally reduced activity on the outcome of certain parapsychological experiments. Another less direct approach is the study of the mechanisms involved in the stimulation of mental processes in healthy or diseased subjects, caused by external physical stimuli of the surrounding atmosphere. Most of these stimuli are not registered by the body in a conscious way but are experienced unconsciously like most parapsychological phenomena. The advantage of this approach is that these stimuli can be controlled and reproduced in special low pressure climatic chambers and can also be observed under natural atmospheric conditions because similar patterns of stimuli usually can be observed in the free atmosphere on a number of days during the same year. This enables us to make a statistical analysis of these so-called biometeorological or meteorotropic phenomena.

Although it is possible to study, in climatic chambers, the effects of controlled meteorological stimuli on the outcome of parapsychological experiments, so far we have been studying more indirect approaches that may give us a clue to the deeper mechanisms involved in the registration centers in the brain which are able to register very subtle external stimuli.

INDIRECT EVIDENCE OF THE EFFECT OF SUBTLE METEOROLOGICAL STIMULI ON MENTAL PROCESSES

We speak purposely of subtle, unconsciously registered meteorological stimuli because strong meteorological stimuli such as heavy rain,

cold or heat immediately affect our conscious feelings of comfort or discomfort and indirectly our mental processes and behavior.

Various studies (Tromp, 1963) have shown the effect of changes in the rate of atmospheric cooling (i.e., the combination of temperature and air movement) on a number of basic physiological processes such as hemoglobin and white blood cell count in blood, blood sedimentation rate, serum-calcium, phosphate and magnesium level of the blood, fibrinogen, albumin, gamma-globulin and Vitamin C level, and blood clotting time. The effects on urinary pH and excretion of 17-ketosteroids or other corticosteroids, or electrolytes, urea and hexosamines can be demonstrated. Other studies have shown the effects of meteorological conditions on the reactivity of the autonomic nervous system (Straube et al. in Tromp, 1963, pp. 195-198), on thyroid, adrenal and liver function, on blood pressure, general metabolism, thermoregulation efficiency, capillary resistance and membrane permeability, and sensitivity to drugs. Several studies suggest also that a surplus or shortage of positive or negative ions in our environment may cause certain physiological changes in the body (Krueger et al.). In other words there is hardly an organ in the human body which escapes the effects of changes in the meteorological environment, and these effects are reflected either directly or indirectly in the mental processes of man.

The effects of meteorological stimuli are different during different periods of the day (biological rhythm). They depend also on the previous physiological history of the subject (Law of Wilder), the degree of acclimatization to the physical environment, the physiological and anatomical typology of the subject and on sex. It could be demonstrated (Tromp, 1963) that if someone is subjected to a changing atmospheric environment during one hour per day only, and he spends the rest of the day in a constant physical environment, the physiological pattern due to the short stay in a cold or hot environment will continue for a considerable time. All these meteorological effects are due to: (1) thermal sensitivity of the thermal receptors in the skin and particularly of the hypothalamus, the principal thermoregulation center in the brain and (2) radiation sensitivity of the pituitary and hypothalamus through indirect stimulation of the eye nerve and other radiation receptors of the body (Benoit, Miline and Hollwich effect). As both the pituitary and hypothalamus affect the emotional centers in the rhinencephalon (J. J. G. Prick, in Tromp, 1963, p. 111) it is not surprising that the mental processes in man are influenced by even subtle changes in the physical environment.

DIRECT EVIDENCE OF THE INFLUENCE OF WEATHER AND CLIMATE ON MENTAL PROCESSES

Although studies have been made of the influence of meteorological stimuli on basic physiological processes and their indirect effect on mental processes in man, it has proved to be extremely difficult to demonstrate direct effects. Still a number of studies support this assumption.

Effects on Schizophrenics:

The Biometerorological Research Center in Leiden carried out a large-scale four-year study of the possible influence of atmospheric and other unknown physical environmental factors on the restlessness and ill-temper of about 200 mental patients, in particular schizophrenics. The study covered seven psychiatric institutes with the cooperation of 21 psychiatrists attached to these institutes and the matrons of the wards. The only patients studied were those with a clear-cut diagnosis, i.e., all psychiatrists of the same institute agreed on the probability of the diagnosis. Daily records (observed during four 6-hour periods of the day) were collected, particularly of the degree of motor unrest in the patients, for which purpose a number of objective criteria were used. The unrest was recorded as the degree above or below the average daily level. Several criteria were used to determine this degree of unrest. A patient was rated restless if he was cursing, insulting other patients or nurses, raging, etc., and as a result other patients became irritated. He was considered very restless if he was throwing things, slapping people, and the nursing staff was being forced to lock the patient up or to start special drug treatment. Of the various groups of mental patients the schizophrenics gave the clearest results. A large number of the observed patients did not receive any medication during our period of study.

The daily percentage of restlessness of this large group of schizophrenic patients fluctuated as a rule between 7% and 43%, the average monthly percentages between 2% and 16%. In a large constant, rather homogeneous group of schizophrenics (homogeneous from the point of view of sex, age and social level) the following short- and long-term cyclic or pseudo-cyclic changes in restlessness were observed:

1. Each year, during the four years of observation, the highest degree of unrest was observed in November, December and January. In some psychiatric institutes a secondary peak of unrest was observed in July and August. The high degree of unrest in winter showed up both

in the high average monthly percentage and in the greater number of days with high daily percentages of unrest.

2. Statistically significant, daily fluctuations are correlated with the periodic or non-periodic influx of warm continental, tropical maritime or warm maritime air masses, causing a gradual rise in temperature of the atmosphere and an increase in unrest. Short-term influxes of cold air masses have a reverse effect. Unpleasant weather conditions such as heavy rainfall and snowstorms, affecting seriously the mood of the nursing staff, do not seem to affect the restlessness of the schizophrenic patient.

Studies carried out in Leiden since 1960 suggest that these short- and long-term, mainly meteorologically triggered fluctuations, seem to be related to a poorly functioning hypothalamic thermoregulation mechanism in schizophrenics, which shows up in the water bath test of Tromp (1964), the test of Henschel (1951) and diuresis pattern studies of schizophrenics (Tromp, 1963). Whereas in a healthy, well-thermoregulated subject the temperature of the hand palm (after 2 minutes' cooling in water of 10° C) reaches the initial value in about 6 minutes, in schizophrenics it may take 20 minutes or more. The initial temperatures are often very low, the difference between initial temperature and the rewarming temperature after 6 minutes is often 4° C or more (water bath test of Tromp).

In the Henschel test the feet of schizophrenics were put in water of 45° C. The time required before the skin temperature of the fingers rose was much longer for schizophrenics than for normals.

In normal well-thermoregulated subjects the urinary output increases during atmospheric cooling and decreases when the atmosphere is warming up. In schizophrenics one observes the opposite (Tromp, 1963).

These various tests clearly indicate an abnormally functioning hypothalamic thermoregulation center as compared with normal subjects, which may be an important factor in the meteorotropic sensitivity of schizophrenic patients.

Another interesting observation concerning meteorological effects on schizophrenics is the relationship found between month of birth and schizophrenia (Tromp, 1963, p. 535).

In recent years in different countries evidence has been collected, requiring further confirmation, that schizophrenia and the incidence of mental deficiency in children are somewhat tied in with the month of birth.

In 1957 Pasamanick (Director of the Research Division of the Columbus Psychiatric Institute at Columbus, Ohio) and Mrs. Knobloch

traced the month of birth of mentally deficient children born between 1913 and 1948 and institutionalized in the Columbus State School. It was found that schizophrenics are born significantly more often in January, February and March as compared with the standard monthly birth distribution in the U.S.A. Since for this group the third month after conception, the period when the cerebral cortex of the unborn child is becoming organized, would be June, July and August, any environmental factor causing a fetal injury in these months might affect intellectual functioning. According to these authors, very high temperatures and decreased protein intake during these months might be some of the causes of such a trauma. They also found that the number of mental defectives born in January or February after a very hot summer is greater than after a cool summer.

The same authors were able to show that the number of abnormalities in pregnancy are significantly higher in January, February and March when compared with the summer months, July to September.

De Sauvage Nolting, former psychiatrist at the Psychiatric Institute Den Dolder (the Netherlands), listed dates of birth of 8,000 schizophrenics in the Netherlands and 7,000 in Great Britain. He found, after the normal seasonal birth rate correction, that a mathematically significant higher birth rate occurred during February and March, a minimum in June and July. No connection with the month of birth was found for epileptics and those suffering from other mental diseases.

Studies by the same author, using material from Australia, showed a similar relationship but with a six-month shift due to its being in the Southern hemisphere. Other authors have confirmed De Sauvage Nolting's observation in other Northern countries.

Studies by Blonsky in Moscow in 1929 suggest that the intelligence quotient of school children in the USSR was highest for children born in the period from January to July, particularly April (in other words conception in July, critical three months' period in October) and lowest between July and December (minimum in October).

Pintner and Forlano (1933), Peterson (1934), Huntington (1938) and Mills (1941) found some interesting correlations between month or season of conception, intelligence quotients and physical development.

Huntington studied 10,832 eminent Britishers listed in the *Encyclopedia Britannica,* and Peterson studied those listed in *American Men of Science.* They found that people conceived in the late summer or early autumn months are less likely to attend college or attain distinction. The highest percentage of distinguished people were conceived in April, lowest in September. Studies by Miller, using 45,000 freshmen enrolling in different American colleges showed the following:

1. Likelihood of college matriculation is 60% greater with children conceived during winter months than with those conceived in the summer heat.
2. The menses in girls begins significantly earlier with conception in the winter months.
3. Height and weight of college freshmen, both males and females, are greater in those conceived during the warmer half year (May to October inclusive).

McKeown of the Institute of Social Medicine in Birmingham stated that in Great Britain more anencephalics are born in the period October-March (maximum in December) than in the period April-September (minimum in May).

Observations during Foehn Weather

The foehn is a very hot and very dry wind which develops when humid air from Italy rises against the high mountains in Switzerland and is followed by heavy precipitation. The dry air reaches the valleys of Northern Switzerland, the Tyrol and Bavaria. Similar winds are known as Santa Ana in California and Tramontana in Northern Italy. Many reports suggest that there are considerable physiological effects due to this hot wind, particularly in subjects with a very sensitive parasympathetic nervous system. Most characteristic symptoms are migraine, mental depression, irritability, dizziness, decreased self-control and slowing of reaction speed. An increase in accidents, suicides and crimes has been reported.

Physiologically it is very likely that foehn conditions, affecting the thermoregulation center and human comfort, could increase the incidence and degree of any pathological condition. However, such extreme thermal conditions are rather rare in the Netherlands, and due to the rapidly changing weather most people in the Netherlands can probably adapt to rapid thermal changes better than people in Switzerland, for example.

Despite extensive studies by Storm van Leeuwen and others, no evidence was found that changes in barometric pressure or in the electrical fields of the atmosphere, accompanying foehn conditions, are responsible for the biological foehn effects. Studies in Israel with the chamsin wind suggest the possible effect of a change in the ion composition of the air. Studies by Regli and Stämpfli (1947) and Lotmar and Häfelin (1955) in Switzerland and by Arimatsu in Japan suggest that shortly after a warm front or foehn passage, due to thermal stimuli, the capillary resistance of membranes decreases (permeability

increases) affecting various metabolic processes, which may be responsible for the described phenomena.

Effect on Suicide and Suicide Attempts

In the Netherlands on the average not even one in every 1,500 inhabitants of a city may attempt suicide during a year. It is therefore striking if on certain days 2, 3, 4 or even more than 5 subjects make suicide attempts. We prepared a table of such cluster days (which proved to have no relationship to special social or other events in the city) for the period 1954–1970 and studied the possible connection with specific meteorological conditions. The principal results of this analysis are the following:

1. There is no simple, direct correlation between temperature, wind speed, precipitation, hours of sunshine and number of electromagnetic impulses of long waves (6 – 100 Km) and days with clusters of suicide attempts or suicides. This explains the negative results of most weather correlations, reported in various publications, because only single meteorological parameters have been compared with the daily suicide cases.

2. Most cluster days are found in periods with strong atmospheric turbulence due to depressions or weather fronts, either passing by or crossing the Netherlands causing strong winds, drastic changes in temperature (either cold or warm air influxes) and often heavy precipitation (rain, snow or hail). Both sudden sharp cooling and considerable warming up far below or above the normal monthly temperature to which the subject is acclimatized, have this triggering effect. Therefore it is more likely that any strong thermal stress (either very cold or very warm) would disturb the thermoregulation mechanism of subjects who intend to commit suicide, particularly if these stresses are accompanied by strong air movements and heavy precipitation related to depression activity and passing weather fronts. These conditions affect also the physico-chemical state of the blood of the subject, his general metabolism and hormonal balance.

3. However, it should be realized that many days during the year may have exactly the same type of weather conditions as have been described without leading to suicide clusters. Psychological, sociological, economic and other factors, in combination with genetic background, must first predispose the subject to a serious mental disturbance requiring only a slight trigger affecting his physiological balance to make a suicide attempt.

Restlessness of School Children

Studies by Ungeheuer and others suggest statistically significant fluctuations in restlessness and comprehension of school children on certain days or during certain periods that cannot be explained by ordinary psychological factors. These days or periods are not related to specific temperatures and the like but seem to be due to weather conditions characterized by strong atmospheric turbulence. Increases in restlessness in summer, shortly before thunderstorms, are probably directly related to high temperatures and humidities that seriously affect the thermal comfort of children, in particular because of the insufficient thermoregulation efficiency of young children (Tromp, 1963, p. 674).

Reaction Speed

Many scientific reports confirm the findings of Bedford et al. (1946), Reiter (1954), Brezowski and others, that thermal stresses and atmospheric conditions, which are characterized by considerable changes in the daily number of electromagnetic impulses due to E. M. longwaves emitted by storm centers, could alter the human reaction speed considerably (up to 25%).

Road and Industrial Accidents

Road and industrial accidents, which are closely related to changes in reaction speed and behavior of subjects, show the same statistically highly significant correlations as just described (Reiter, 1951, 1956; Bedford et al., 1948). Reiter's studies particularly, using 362,000 industrial accidents, are very convincing.

Weather and Climate and Behavior

Effects of weather and climate on human behavior have been demonstrated under extreme thermal stresses in tropical countries and in climatic chambers. Also effects on learning capacity, biological rhythms and other behavioral aspects of animals have been widely studied in insects, birds, pigs and other animals (Tromp and Weihe, 1967, pp. 143–147). However, a considerable amount of work still lies ahead in this field of research.

Reproduction

Reproduction in man, contrary to that in animals, is controlled to a certain extent by mental processes. Studies in animals have shown beyond doubt that reproduction habits can change due to changes in

climatic conditions (Review paper by Smidt, in Tromp and Weihe 1970, pp. 157–166).

Macfarlane has summarized our present knowledge on seasonality of conception in human populations at different latitudes. Spring maxima occur in countries located between 30° and 45° latitude; summer-autumn maxima are most common between 45° and 48°; winter maxima occur in Southern India, Puerto Rico, Northern Australia, South Africa and Chile (Review paper by Macfarlane in Tromp and Weihe, 1970, pp. 167–182).

POSSIBLE PHYSIOLOGIAL MECHANISMS INVOLVED IN WEATHER-CONTROLLED MENTAL PROCESSES IN MAN

It was previously mentioned that all thermal stimuli reaching the body are recorded by the hypothalamus, our thermal brain, which in turn controls many physiological functions of the pituitary and its many endocrinal activities. It influences also the autonomic nervous systems and the rhinencephalon or olfactory brain.

The very subtle processes in the hypothalamus seem to depend on various physico-chemical processes, including minor shifts in concentration of serotonin (5-hydroxytriptamine), noradrenalin and adrenalin (Vogt, Amin and others). According to Donner, Feldberg and Meyers , an excess of free serotonin or catecholamines in the anterior part of the hypothalamus seems to be responsible for the level of body temperature. If we realize that a temperature rise in the environment of 1° or 2°C is hardly noticed, whereas a similar temperature change in the body could create great discomfort, it is evident that the hypothalamic functions belong to the most fundamental physiological mechanisms of the human body.

The hypothalamus is situated between the rhinencephalon and the pituitary. Its influence on the rhinencephalon is very important because, contrary to former belief, only a small part of the rhinencephalon is actually primarily concerned with the perception of smell. The major part plays a very important role in our unconscious psychic life, i.e., our instinctive and emotional behavior, including our moods (Prick, in Tromp 1963, p. 302). Prick and others called the complex rhinencephalic-hypothalamic-hypophysical system our emotional brain, instinctive brain and brain of unconsciousness. However, the rhinencephalon is also involved in consciously experienced feelings and emotions. Only the highly differentiated parts of this center are concerned functionally with the mediation of these experiences.

Consciously experienced stimuli are primarily registered by certain

parts of the telencephalon (cerebrum) often called the cognitive brain. Only proper integration between the cognitive and emotional brain produces balanced physiological processes in the body.

Apart from the hypothalamus, pituitary and rhinencephalon, a fourth center in the brain plays an important role in recording of weak external stimuli, that is, the epiphysis or pineal gland, also known as our photoperiodic brain. As the result of studies by Wurtman (1963), Axelrod (1965), and Kelley (1962), the great significance of this gland in natural biological rhythms has been recently established. The gland is located at the posterior lower part of the corpus callosum, which lies at the bottom of the cerebrum. It is not a gland in the classical sense but rather a neuroendocrine transducer, regulating the timing of physiological events. The gland is rich in biologically active amines (Giarman and Day, 1959), as is the hypothalamus. It is rich in noradrenalin, histamine and, in particular, serotonin, which show striking diurnal changes. The serotonin content is highest at 1 P.M. and lowest at 11 P.M. A similar clear periodicity is observed in the noradrenalin of the pineal, with the maximum level at night and the lowest level during the day. Consequently the pineal gland is an important component of the endogenous time measuring system. The release of the pineal hormone melatonin does not take place, as in most glands, in response to instructions received via the circulation, but is due to direct nerve impulses that are controlled by light stimuli reaching the pineal via the retina. The pineal gland is richly innervated by sympathetic nerve terminals. These nerves originate in the superior cervical ganglia. The terminals have swellings containing noradrenalin. The key enzyme localized in the pineal gland is hydroxyindole-O-methyltransferase, which is responsible for the synthesis of melatonin. In darkness the synthesis increases; in a lighted environment it decreases. As a result the pineal gland acts as a biological clock that informs the body about the light intensity of its environment and the hour of the day. The most well-known effects of the pineal hormone are skin color changes due to its effect on pigmentation, and the inhibition of the gonadal function in mammals. The many photoperiodically controlled biological rhythms in mammals seem to be controlled, in major part, by the photoperiodic properties of the pineal gland.

These various brain centers, the thermal brain (hypothalamus), the photoperiodic brain (pineal gland), the pituitary, the emotional brain (rhinencephalon) and the cognitive brain (cerebrum) play a vital role in the registration of all subtle external, unconsciously registered stimuli that are transformed into consciously perceived phenomena. It

seems most likely that not only meteorotropic phenomena but also the parapsychological (or supersensoric) stimuli, either of a physical or nonphysical nature (as assumed by certain groups of parapsychologists), are registered by one or more of these brain centers controlling the mental processes.

THE SIGNIFICANCE OF BIOMETEOROLOGICAL STUDIES FOR PARAPSYCHOLOGY

The previous review of physiological mechanisms involved in the human brain, in connection with very weak external physical stimuli that derive from our atmospheric environment and are registered by our body, may give a clue to the various processes in the brain responsible for parapsychological phenomena. Both meteorotropic and parapsychological phenomena are usually unconsciously perceived but in the case of parapsychological phenomena repetition of an experiment is usually very difficult or impossible, and as a result a statistical probability analysis is excluded. On the other hand meteorotropic phenomena can often be imitated and repeated, which enables us to establish the existence of certain physiological relationships. Therefore, in our opinion, the study of the various physiological mechanisms of mental processes in man in relation to those meteorological stimuli that are unconsciously perceived will prove to be a valuable tool in the future for the study of the mechanism and mode of perception of parapsychological phenomena.

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DISCUSSION

DINGWALL: I must say it is a pleasure for me to be here with my old friend Tromp occupying the platform. I have followed his work for a great many years and I confess a certain amount of prejudice, because one of my ancestors was the man whose "History of Civilization" I hope most of you have read, or at least some of you. He stressed the

importance of the effect of climate and weather on human beings. Now, as far as I know, Tromp is the only person who has attempted to tackle this enormously complex problem. Because it has so infinite a number of variables infinitely difficult to distinguish, it is difficult to cut away what may not be responsible from what might be responsible and then to cut it down still further to find out that when you omit one particular factor, the phenomenon ceases. When you see the kind of work that Dr. Tromp has done: moon, sun, weather, climate, heat, I think his courage is quite stupendous. I cannot congratulate him enough. Because it does not only require great courage, but it requires courage in the face of opposition. As you know, I have had opposition all my life for my views. But, many people on reading this sort of thing will think: This is pure waste of time and all nonsense. But I assure you that if you looked into any of these things yourself, you would find that it is very far from nonsense. Of course, there is a mass of folklore, of stories, of anecdotes, but I think one has only got to live oneself to know the effect of climate and weather and other things on human life and human personality. The point is, of course, to determine exactly what is happening. Now take the moon. I have a lady living next to me who, apparently, is affected by the moon. She is very difficult to investigate especially during her phases in which it is impossible even to approach her. But she only behaves like that at certain times, when the moon is at a certain aspect. It may be suggestion, it may be the light of the moon, it may be a dozen things. But here we have Dr. Tromp who is endeavoring to nail these things down, and I am very glad that in this sort of thing I do not find much indication of the occult or ESP.

ZORAB: Dr. Tromp, are you aware that your findings of more schizophrenics being born in certain months are quite contradictory to the findings of geneticists? There are quite a number of studies done with identical twins, in the case of schizophrenia, and it has been found now that about 40% of the two identical twins showed schizophrenia, while if you compare them with two-egg twins, you find it in only 12% of the two twins. How are the findings of Dr. Tromp going to compare with the findings of the geneticists? They say that schizophrenia is, more or less, genetically based.

TROMP: These genetic factors must, of course, be considered. We are not saying that genetics have no effect, but that it is only one effect.

ZORAB: I do not think there is any effect in ESP or in PK. As far as I know, we have not found any meteorological effects stimulating the performances of the subjects. I only know of one case, here in Holland, when in 1946 everybody—nearly everybody—started throwing dice.

After the war, it had just become known that Rhine had done quite a lot of work in PK dice throwing. There was one of the members of the Dutch Society who threw about 120 times. But no significant effect. No significant results. Only when there was, in the afternoon, a tremendous thunder storm, suddenly the results jumped up to a high level. Whether this was coincidence, I do not know. Anyhow, the subject claimed that the shock and the fright had suddenly increased his PK powers.

TROMP: Surely, you must realize that in all this work you can only do it if you have very extensive material at your disposal. And, of course, if you work with parapsychology now, you have not the vast material. If you had, let us say, a very good couple working together, then you could do it. But it has never been done.

CUTTEN: This is undoubtedly the most important, most interesting work and it is obvious that there is a great deal more work to be done. Some of these questions are being asked perhaps a little too early to give the final answer to them. I think you missed one point. I was not quite sure to what extent some of these effects were influenced by the weather and to what extent they were influenced by the actual month of the year. I wonder if you could clarify this a bit. For instance, you were saying that there are more suicides during periods of inclement weather—and that would normally be perhaps November and December. It happened this year in England that on the shortest day in June it was two degrees colder than on the longest day in December. How much would that affect the normal statistics? Does it affect it to any great extent, or is it mostly affected by the weather?

TROMP: I can only speak about the Netherlands in connection with this material I have, which is very vast and very carefully collected personally from patients in the hospitals, not just statistics. It is very difficult, these cluster days. You find them all through the year and it is clearly a seasonal phenomenon. If you take the seasons in various provinces in the Netherlands, the seasonal effect is not very clear. There is undoubtedly some coincidence in certain types of patients because the mental patients are assessed at the end of the year. But a clear-cut seasonal effect, you do not find. You find these cluster days throughout the year. That is the material we have been working with since 1954.

CUTTEN: In other words, your results so far show that the weather is more significant than the season.

TROMP: No. Not this particular case. If you take, for example, thermo-effects, we know this fact may have a seasonal period too. Take heart diseases. There is a clear-cut relationship. In winter time, in our

Northern Hemisphere, here in Europe and in the United States, you find the highest incidence of mortality and morbidity in January and February. You can also prove it has nothing to do with snow shoveling, as a lot of people say. On the other hand, it is interesting that in the southern part of the United States, where you have hot summers, it is the reverse. There you find your maximum in summer and the minimum in winter. So they are seasonal problems, pseudo-seasonal. That does not mean that they always have to come, let us say, in March. We must consider that there are seasonal phenomena, pseudo-seasonal and daily changing with the weather.

ROGO: I would like to make two comments on what was just said by Dr. Zorab. First on the twin versus schizophrenia. I think it must be kept in mind that in those twin studies, the twins were raised in a similar environment. But when the twins were separated and brought up in different environments, statistics of incidences of schizophrenia are much lower. There is quite an important environmental background and I cannot believe that the genetic factor is that important, as the twin study would suggest. Also on the relationship of psi to weather: In 1969, I was involved in 50 experiments with producing ESP effects. We had success with about 30 out of these 50 times, mild but notable success. We took great pains to keep track of all weather conditions, expecting to find correlatives. But we found absolutely none.

TROMP: What were the parameters you used? Temperature? Humidity? What about electrical components.

ROGO: We used temperature and humidity, but I do not think we used electrical components.

TROMP: Maybe it has to do with static electricity.

WEST: I would just like to make a comment about the idea of investigating correlations between birth date and social and biological phenomena and attributing them to meteorological influences. There are so many other influences that might be responsible for them. To give an example, you mentioned IQ and month of birth. In the English educational system, according to what month you are born in, you may have almost the whole year of extra education because admissions to the schools take place only once a year. This may make a very big difference to the IQ.