



I.A.R.P.

Research for Religion and Parapsychology

Number 17

December 1987

PSYCHOPHYSIOLOGICAL CHANGES DUE TO THE PERFORMANCE OF THE PHOWA RITUAL

— On the Basis of Meridian Function, EEG, and GSR Data —

by Hiroshi Motoyama, Ph.D.

EEG MONITORED DURING THE PHOWA RITUAL

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ANALYSIS OF REAL CASES OF NEAR-DEATH EXPERIENCES

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FIRST EDITION 1987

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Religion and Parapsychology.
4-11-7 Inokashira, Mitaka-shi, Tokyo 181

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and Fumio Akasaka.

In this paper, changes in the nervous and meridian systems, and also changes in brain activity due to the performance of the Phowa ritual are discussed based on the data mentioned above. Furthermore, a reference is given to the relation between the meridians, chakras, and Siddhi (psychic powers) of Yoga.

I. MERIDIAN FUNCTION OF THE RINPOCHE

A. Analysis and Discussion of the AMI Control Data⁽²⁾

1. AMI Data Taken on June 17th, 1983 (Figure 1)

a. Overall Condition⁽³⁾

The averaged before polarization value (AVE BP) was lower than the normal criteria. In Fingers/Toes (F/T), which indicates the balance between the upper and lower halves of the body, the values of all four parameters (AP, TC, BP, IQ)⁽⁴⁾ were less than 1 (F<T). This indicates that nervous, meridian, and polarization-metabolic function was more active in the lower half of the body than in the upper half. In Left/Right (L/R), which indicates the balance between the left and right halves of the body, the average of the left side values was larger than that of the right in three parameters (AP, TC, BP). This indicates that nervous and meridian function was more active in the left half of the body than in the right.

b. Individual Meridians⁽⁵⁾

Ki depletion⁽⁶⁾ was observed in the Small Intestine and Kidney meridians, which have a close connection with the urogenital system. There was an excess of Ki in the Liver meridian, and Ki imbalance in the Spleen and Large Intestine meridians. These three meridians have a close connection with the digestive system. Ki depletion was also found in the Heart meridian, and Ki inverse and excess conditions were found in the Lung meridian.

2. AMI Data Taken on June 21st, 1983 (Figure 2)

a. Overall Condition

The averaged BP and IQ values (AVE BP & AVE IQ) were lower than the normal criteria. In the data taken two days later, his AVE BP was within the normal criteria. The lower than normal BP values on the 17th and 21st suggest that fatigue from the trip and participation in the conference was affecting Rinpoche. All the parameters in F/T were less than 1 (F<T); the BP and AP values especially were lower than the normal criteria. In L/R, the average of the left side values was larger than that of the right in all the parameters, showing an imbalance beyond the normal criteria. This indicates that nervous, meridian, and polarization-metabolic function was more active in the left half of the body.

b. Individual Meridians

Ki depletion was found in the Small Intestine and Urinary Bladder meridians, from which functional weakness in the urogenital system is surmised. Ki excess was found in the Liver and Stomach meridians, and Ki imbalance and inversed conditions in the Spleen meridian. These three meridians have a close connection with the digestive system. Ki imbalance was also found in the Heart constrictor meridian.

3. Considerations

Rinpoche's meridian function and the corresponding character, constitution, and chakras⁽⁷⁾ are considered on the basis of the above two AMI data taken as controls on June 17th and 21st, 1983.

a. Overall Condition

All the parameters in F/T in both sets of data showed a higher average on toes. Generally, people who show F<T have an introverted character and a tendency to depression.

All the parameters in L/R in both sets of data (except the

IQ value on June 17th) showed a higher average in left side values.

b. Individual Meridians⁽⁸⁾

The Ki depletion observed in the Small Intestine, Kidney and Urinary Bladder meridians suggests a constitutional tendency to develop abnormalities in the urogenital system, and corresponds to his report that he had been given a diagnosis of weak Kidney function.

Ki excess and imbalance were observed in the Liver, Spleen, and Large Intestine meridians. This suggests a constitutional susceptibility to disease in the digestive system as well, and would explain the stomach ulcer he has been suffering from.

Along with the correlation between meridian function and organic conditions, my long-term yoga practice has suggested a specific connection between meridians and chakras (in yogic tradition), and our studies with the AMI have verified that when a chakra becomes active or starts to function in a higher dimension, the meridians which are closely connected with that chakra start to function beyond their usual range. This wider range of functioning is monitored as a deviation of its Ki level, and is referred to as depletion, excess, imbalance, or inverse when compared to normal criteria.

The Small Intestine, Kidney, and Urinary Bladder meridians are closely connected with the Svadhishtana Chakra, and this chakra is said to be the storage of the unconscious⁽⁹⁾. It is surmised that Svadhishtana activation more easily occurred in Rinpoche because of constitutional factors.

The Liver, Spleen and Large Intestine meridians have a close connection with the Manipura Chakra. This chakra is said to control digestion, emotion, imaginative power, ability for extra-sensory perception (ESP), and to have a close tie with the subtle body⁽¹⁰⁾.

It can therefore be surmised that the Rinpoche has a constitution susceptible to disorders in the digestive and urogenital systems, a wide emotional range, a strong imagination, ESP ability, and the power to affect other subtle entities.

B. Analysis and Discussion of the AMI Data Taken before and after Performance of the Phowa Ritual

1. AMI Data Taken before the Phowa Ritual (Figure 3)

a. Overall Condition

No significant abnormality in AP and BP values was found in the assessment of AVE, SD, F/T and L/R, except for the BP in L/R, in which the imbalance between the left and right half was beyond the normal range of criteria.

b. Individual Meridians

Ki depletion was observed in the Small Intestine and Urinary Bladder meridians; Ki inverse in the Kidney meridian; Ki excess in the Lung and Liver meridians; and Ki imbalance in the Urinary Bladder and Gall Bladder meridians.

2. AMI Data Taken after the Phowa Ritual (Figure 4)

a. Overall Condition

The average BP and AP values increased, and fell within the normal criteria in the AVE and also SD assessment. AP values in F/T were higher than the upper limit of the normal criteria and indicated F>T. BP values in L/R were higher than the upper limit of the normal criteria and indicated L>R.

b. Individual Meridians

Ki depletion was found in the Gall Bladder and Small Intestine meridians; Ki inverse in the Spleen and Heart Constrictor meridians; Ki excess in the Liver and Lung meridians; and Ki imbalance in the Heart and Spleen meridians.

3. Considerations

a. Overall Condition

The average of all the parameters (AP, TC, BP, IQ) increased after the performance of the Phowa ritual. This suggests activation and excitement of the entire autonomic (especially sympathetic) nervous system, meridian system, and polarization-metabolic function.

In F/T of AP values before the Phowa ritual, the average of finger values was smaller than the average of the toe values (F<T) within the normal criteria, but it became F>T beyond the upper limitation of the normal criteria after the ritual. This suggests that during the ritual, the sympathetic nerves were excited more in the upper half of the body than in the lower half. The IQ value, the parameter of polarization and metabolic condition, was also smaller than the normal criteria in F/T before the performance of the Phowa ritual. That is, the polarization-metabolic function was more active in the lower half of the body than in the upper half before the Phowa ritual. It also increased and fell within the normal criteria (close to 1) after the ritual. No significant changes were monitored in the parameters in L/R. The BP and IQ values were larger in the left than in the right half of the body both before and after the ritual.

During the Phowa ritual, concentration is on the top of the head (Brahman Gate)⁽¹¹⁾, and Buddhas and Mandalas are visualized at the same place. An attempt is made to make an opening there, and the separation of the soul from the body is strongly imagined. The increase of these finger values, therefore seems to suggest activation of the upper half of the body during the Phowa ritual.

b. Individual Meridians

Ki excess and functional excitement were monitored in the Lung

meridian before and also after the Phowa ritual.

No abnormality was monitored in the Spleen meridian before the ritual, but inverse and imbalance in this meridian was monitored afterwards. This coincides with experimental observations made on psychics at the Institute for Religious Psychology, i.e., psychics with strong ESP ability have a tendency to show abnormal functioning and deviated Ki levels along the Spleen meridian. The same tendency has repeatedly been observed when ESP was used and/or when spiritual possession took place. It can therefore be surmised that Rinpoche used his ESP and/or was possessed by higher entities during the Phowa ritual.

The Heart meridian showed imbalance after the ritual, although it was normal beforehand. The Heart meridian has a close connection with the Anahata Chakra⁽¹²⁾ of yogic tradition and this suggests that the Anahata was activated during the Phowa ritual.

The Small Intestine meridian was deficient both before and after the ritual, which suggests functional weakness of this meridian.

The Urinary Bladder meridian was deficient and imbalanced before the ritual, but became normal after its completion. In Oriental medicine, the Urinary Bladder meridian is said to have a close connection not only with the urogenital system but with every organ and tissue in the entire body. Furthermore, it is said that this meridian distributes Ki to the brain in its course. It is surmised that the concentration on the Brahman gate during the Phowa ritual activated this meridian and normalized its deficiency and imbalance.

The Kidney meridian became normal after the ritual, although it was deficient and imbalanced before. The Kidney meridian has a Yin-Yang relationship with the Urinary Bladder meridian⁽⁵⁾, and both the meridians have a close connection with the urogenital

system and Svadhishtana Chakra. It would appear that Ki was distributed to both the Kidney and Urinary Bladder meridians, and also that the Svadhishtana Chakra became activated during the performance of the Phowa ritual.

The Heart Constrictor meridian was inversed both before and after the ritual, indicating deficiency of Ki.

The Gall Bladder meridian was imbalanced before the ritual, but became deficient afterwards.

The Liver meridian was excessive both before and after the ritual.

C. Conclusions

1. Summary of the Discussions on the AMI Data Taken before and after the Performance of the Phowa Ritual

a. Overall Condition

After the Phowa ritual, the nervous, meridian, and polarization-metabolic function became active and excited. This activation and excitement was more conspicuous in the upper half of the body than in the lower half.

b. Individual Meridians

The individual meridians which showed significant changes before and after the Phowa ritual were the Spleen, Kidney, and Urinary Bladder meridians. The Spleen meridian was normal before the ritual, but showed inversion (less Ki) and imbalance afterwards. The Kidney and Urinary Bladder meridians were deficient and imbalanced before the ritual, but became normal after the ritual.

It is surmised that Ki was distributed to the Urinary Bladder and Kidney meridians (said to have a close connection with Ki in the brain) and that these functions became normal due to concentration on the Brahman Gate. On the other hand, the Ki inverse and imbalance in the Spleen meridian after the ritual suggests that Ki consumption in this meridian was perhaps a

result of possession by higher entities and/or the use of ESP ability triggered by the visualization of a mandala.

2. Comparison and Consideration between the Controls and Data before and after the Phowa Ritual

The following can be said after comparing the above considerations (Section C.1) with the control data taken on June 17th and 21st, 1983.

a. Overall Condition

In the AMI control data, the average of the toe values was larger than that of the finger values in all the parameters (AP, BP, TC, IQ). This suggests that the nervous, meridian, and polarization-metabolic function was usually more active in the lower half of Rinpoche's body. However, the finger values increased in AP and IQ after the ritual, that is, the nervous and polarization-metabolic function became more active and excited in the upper half due to the performance of the ritual.

The averages of the left side values were larger than those of the corresponding right side values (L>R) in all the data, except in TC monitored before the ritual. This suggests that the meridian, nervous, and polarization-metabolic function was more active and excited in the left half than in the right half of the body, whether the Phowa ritual was performed or not.

b. Individual Meridians

The Small Intestine, Urinary Bladder and Kidney meridians, which have a close connection with the urogenital system and Svadhishtana Chakra, were usually deficient, as shown in the control data. These meridians were also deficient and imbalanced in the data before the performance of the ritual. However, after the ritual, the Kidney and Urinary Bladder meridians became normal. This would probably result from an increased Ki distribution in these meridians through the ritual.

A usual excess and imbalance of function in the Liver, Stomach, Spleen, and Large Intestine meridians was also indicated in the control data. These meridians have a close connection with the Manipura Chakra and the digestive system. A constitutional tendency to develop abnormalities in these meridians is indicated by these abnormal patterns.

After the performance of the Phowa ritual, the condition of the Stomach, Liver, and Large Intestine meridians remained unchanged, but the Spleen meridian underwent a significant functional change, that is, it became inversed and imbalanced. This indicates that functional change occurs more easily in this meridian than in the others. As was previously explained, the Spleen meridian has a close connection with imaginative power, ESP ability, spiritual possession, etc., so the Ki inverse and imbalance in this meridian after the ritual would probably be due to the use of ESP and outflow of Ki or mental energy through the top of the head.

II. EEG AND GSR OF THE RINPOCHE⁽¹³⁾

A. EEG (Monopolar) and GSR Taken during Relaxation and Meditation before and between the Prayer Sessions⁽¹⁴⁾

At the beginning of the EEG measurement, low voltage fast waves (10 - 20 μ V, around 30Hz) were predominant in areas other than the occipital, where α waves (9 - 13Hz) were predominant. This would probably be because the Rinpoche was tense for his first experience of EEG measurement. However, the slow wave components emerged and were mixed, especially at F_{p1} , F_{p2} , F_1 , F_4 , C_1 , C_4 , etc. (EEG1,0001). As he became accustomed to the procedure, the emergence of fast wave components decreased. The α waves (around 11Hz) became generally constant in the occipital and α mixed with a smaller number of fast waves became predominant in other signal pick-up (electrode) sites (EEG2,0191).

During the meditation, α and θ waves (7 - 11Hz) mixed with the fast waves (20 - 40 μ V) were constant at F_{p1} , F_{p2} , F_1 , F_4 , C_1 , C_4 ; 40 μ V, 11Hz α waves were predominant at O_1 and O_2 ; 10 - 20 μ V fast and slow waves were interchangeably monitored at F_7 , F_8 , T_3 and T_4 . However, even during the meditation there was a tendency for high voltage slow waves to appear at F_{p1} , F_{p2} , F_1 , and F_4 (EEG3,0120). Only a few GSR signals were monitored.

B. EEG (Bipolar) and GSR Taken during Relaxation before the Prayer

1. 5 - 6Hz, 50 - 90 μ V high voltage slow waves were monitored for 2.5 second synchronously at F_{p1} - C_1 and F_{p2} - C_4 . 5 - 6Hz, 40 - 90 μ V high voltage slow waves were also monitored at F_1 - F_7 , F_1 - F_8 (EEG4, 0017).

There was a time-lag of about 0.1 second between the slow waves monitored synchronously at F_{p1} - C_1 , F_{p2} - C_4 and those at F_1 - F_7 , F_1 - F_8 . The GSR signals were recorded in the palm and at all the electrode sites on the head.

2. When the high voltage slow waves were monitored at these sites, the waves monitored at the other electrode sites were also slower and showed higher voltage than in the preceeding and following periods.

3. In the combination of F_7 - T_3 , F_8 - T_4 , F_{p1} - F_7 , F_{p2} - F_8 , C_1 - O_1 , C_4 - O_2 , T_3 - O_1 , T_4 - O_2 , such high voltage differences as observed in the above 4 electrode sites were not seen.

4. Emergence of high voltage slow waves was observed at F_{p1} - C_1 , F_{p2} - C_4 , F_1 - F_7 , F_1 - F_8 , with a synchronous GSR recording. This tendency was observed 2 - 3 times in successive recordings of Bipolar EEGs at the same electrode sites. The emergence of high voltage slow waves at these electrode sites indicates that there is a location in the cortex where functional deterioration easily occurs, that is, in the cortex which corresponds to F_1 and

also to F_1 , F_4 , F_{p1} and F_{p2} . F_1 is the electrode site which corresponds to Broadman's 8th and 9th areas (concerned with high grade mental function and distinguished from the sensorimotor areas). Thus, the above result indicates that the center of the sympathetic nerves (in the hypothalamus) was excited in Rinpoche, while hypofunction in the 8th and 9th areas was observed.

C. General Changes during the Prayer

1. Compared with the α wave predominance in the occipital, and the mixed recording of α and fast waves at the other electrode sites during the relaxation, irregularity of the voltage and the frequency and increase of the slow wave components became remarkable in the background activity at all the electrode sites. Along the time lapse, a fixed pattern and rhythm was observed in the mixed recording of the fast, α , and slow waves, and the irregularity decreased.

2. High voltage slow waves (5 - 6Hz) were monitored at F_1 , F_4 , F_7 , F_8 , with the center at F_1 . These are considered to be the EEG taken from the cortex which corresponds to Broadman's 8th area. This 8th area is the association center in the frontal lobe, which is concerned with high grade mental function. The recorded EEG pattern was similar to that obtained in cases of anemia, edema, and an increase of brain pressure in the frontal association area.

3. Diffusive high voltage slow waves (40 - 120 μ V, 6-8Hz) and α waves (10 - 11Hz) were often monitored for a duration of around 3 seconds at all the electrode sites. The GSR signals were often monitored (EEG5, 0066): The signals monitored at F_1 and F_4 were the highest; those at C_1 and C_4 were next; and those at F_7 and F_8 were third.

Furthermore, the voltage was larger in the left side than in the right side. That is:

70 - 140 μ V at F_1 > 60 - 110 μ V at F_4
 50 - 140 μ V at C_1 > 30 - 90 μ V at C_4
 40 - 90 μ V at F_7 > 40 - 80 μ V at F_8

This tendency was also observed at F_{p1} and F_{p2} . Therefore it seems that functional alteration more easily develops in the left frontal lobe than in the right frontal lobe in Rinpoche, especially in the brain areas corresponding to F_1 and F_4 .

The frequent emergence of high voltage slow waves at all the electrode sites during the prayer would probably come from the lower cortex. Although it is not clear from which part of the lower cortex they derive, they may result from the excitation of the autonomic nerve center in the hypothalamus. This is because the GSR signals, indicator of excitation of the sympathetic nerves, were frequently monitored in the palm and at all the electrode sites during the prayer (EEG6, 0176).

4. Strong eye movements (similar to conjugate deviation of the eyes) were frequently observed (EEG7, 0179). The 8th area is known to have a connection with such eye movements. It has been reported that electrical stimulation towards the 8th area generates a conjugate deviation of the eye, and that such functional excitation leads to hypofunction of that area, as in the case of epilepsy. The strong eye movements in Rinpoche at the end of the prayer may therefore have been due to hypofunction of the 8th area in the frontal lobe during the prayer.

D. General Changes during the Phowa Session

1. At the beginning of the Phowa session, mixed recordings of low voltage fast, α , and slow waves were predominant in the background activity, but the slow waves became predominant along the time lapse.

2. In the electrode sites other than O_1 , O_2 , T_1 , T_4 , 5 - 6Hz high voltage slow waves of 1 - 2 seconds duration were frequently

monitored. The highest voltage waves (more than 100 μ V) were observed especially at F_1 , F_4 , F_{p1} , and F_{p2} , while the voltage of the background activity was low (EEG8, 0247 - 8).

3. Eye movements became stronger than those during the prayer, and GSR signals were frequently monitored in the palm and at all the electrode sites (EEG9, 0253).

E. Differences between the Changes Observed during the Prayer and Phowa Sessions

1. At the beginning of the prayer, irregularity in voltage and frequency, and a slowed wave pattern were conspicuous in the background activity, but a fixed pattern of mixed fast, α , and slow waves became predominant with time. Compared with this, the slow wave components became more predominant during the Phowa session. Furthermore, when the high voltage slower waves (1 - 2 minutes duration) were monitored at F_1 , F_4 , F_{p1} , and F_{p2} , the voltage of the background activity became low.

Fast, α and slow waves were observed in the background activity at the beginning of both the prayer and Phowa sessions. With a time lapse they settled into a fixed pattern and rhythm during the prayer, and became slower and lower voltage during the Phowa. This seems to suggest that the entire functioning of the brain was suppressed to a higher degree during the Phowa than during the prayer.

2. High-voltage slow waves of 5 - 6Hz were frequently observed at all the electrode sites, especially at F_{p1} , F_{p2} , F_1 , and F_4 . There is no significant difference in this observation between the prayer and Phowa sessions.

3. The eye movements and GSR signals were more frequently observed during the Phowa than during the prayer.

4. From these observations, the following can be said:

The degree of hypofunction of the entire cortex, especially

of the 8th area, and the excitation of the hypothalamus, was more conspicuous during the Phowa. Furthermore, as was mentioned previously, the voltage of the 5 - 6Hz slow waves was larger at F_1 than at F_4 , and at F_7 than at F_8 ; that is, it was larger in the left than in the right. This suggests a larger degree of functional alteration in the left.

III. CONCLUSIVE CONSIDERATIONS FROM THE AMI AND EEG DATA

As previously mentioned, in both acupuncture classics and clinical experiences, it is found that the Urinary Bladder meridian distributes Ki to the brain as well as controlling the urogenital system. Thus, I found a comparative observation of the EEG and the Urinary Bladder meridian interesting.

The function and Ki along this meridian was activated and increased during the Phowa. On the other hand, the EEG and GSR taken during the Phowa showed hypofunction of the entire brain activity, especially in the 8th, 9th and 10th areas corresponding to F_1 , F_{p1-2} , and F_{3-4} , and indicated excitation of the autonomic nervous center in the hypothalamus.

From these indications, is there any antagonistic functional relationship between the Urinary Bladder meridian and the cerebral cortex that would account for the hypofunctioning of the cortex when the functioning of the Urinary Bladder meridian is increased? Is there a parallel relationship between the function of the autonomic nerves and that of this meridian, or rather, of the meridian system in Rinpoche?

In AMI data collected for over 15 years, both parallel and antagonistic relationships have been observed between the AP value (parameter of the autonomic nervous function) and the BP value (parameter of the meridian function). So far, in our physiological tests on yogis and psychics performed with the AMI and EEG: 1) a far more active function of the autonomic nerves

than usual was shown; 2) there was a dynamic balance and wider range of function between the sympathetic and parasympathetic nervous systems; 3) there was more Ki and their meridian function was more active than usual; 4) the slower components of α wave (8 - 10Hz) were predominant and constant at all the electrode sites in their EEGs.

A comparison was made between the above test results on yogis and psychics and those on Rinpoche obtained during this experiment: Excitement of the autonomic (sympathetic) nerves, and Ki and functional increase in the entire meridian system, especially in the Urinary Bladder meridian, was observed in Rinpoche during the Phowa session. These patterns were the ones which had commonly been observed in psychics and yogis. In contrast, EEG patterns observed during the Phowa differ from those found to be typical of yogi's relaxation and meditation. High voltage slow waves (θ) were frequently mixed at all the electrode sites, especially at those corresponding to the frontal lobe. This indicates a more suppressed function of consciousness in Rinpoche. Deep meditation or Samadhi can only be achieved when conscious functioning is suppressed.

I believe that the frequent emergence of slow waves during the Phowa corresponds to these experiences.

* * *

T. Fujiki, who took Rinpoche's EEG in this experiment, wrote a short article quoting recent research papers in frontal lobe and association area research. His article is presented in the following pages.

<FIGURES>

Brief Explanation of the Indications Marked in the Following AMI Data Sheets

- Exc.1 -- Ki is most excessive
- Exc.2 -- Ki is 2nd most excessive
- Def.1 -- Ki is most deficient
- Def.2 -- Ki is 2nd most deficient
- Imb.1 -- Ki is most imbalanced
- Imb.2 -- Ki is 2nd most imbalanced
- Inv.1 -- Ki is most inversed
- Inv.2 -- Ki is 2nd most inversed

'*' indicates an abnormal value deviated from the upper or lower limits of the normal criteria

(Inc.) -- An increase over the corresponding value of Before Ritual

→N ----- The abnormally deviated value is within the normal criteria



The AMI System

Measurement date:

June 17th, 1983

Measurement
Conditions:

Usual condition

Subject name:

Ven Ayang
Rinpoche

Medical history:

Stomach ulcer
Kidney troubles

Current symptoms:

Stomach ulcer

Ave AP 32.3
Ave TC 9.1
Ave BP 1834 <
Ave IO 3165

STANDARD DEV.
AP 0.590
TC +0.131
BP 0.156
IO +0.262

FINGERS/TOES

AP 0.022 < 0.789 < 0.9363
TC 0.059 < 0.970 < 0.9298
BP 0.069 < 0.993 < 0.9957
IO 0.099 < 0.941 < 0.9316

upper lower limit
limit of NC
of NC LEFT/RIGHT

AP 0.133 > 1.2093
TC 0.024 > 1.0212
BP 0.051 > 1.0410
IO 0.035 > 1.0995

lower upper limit of NC
limit
of NC

Figure 1

AMI DATA SHEET

	DX	LY	RX
LUNG	AP 0.024 TC 0.130 BP 0.273 IO 0.713	14 0.528 11 0.917 3 1.154 10 0.838	10 0.537 8 0.928 3 1.198 7 0.979
Exc.2 Inv.2	AP 0.553 TC 0.130 BP 2.701 IO 1.352	8 0.890 6 1.026 2 1.190 5 1.001	8 0.693 5 1.037 12 0.835 9 0.814
LARGE INTEST.	AP 0.297 TC 2.224 BP 0.514 IO 0.035	3 1.323 1 1.365 5 1.050 6 1.064	4 1.212 1 1.179 7 0.983 5 1.071
Imb.2	AP 1.370 TC 1.308 BP +2.759 IO 0.156	7 0.930 14 0.819 9 0.944 14 0.722	11 0.417 8 0.928 1 1.306 15 0.753
Imb.1	AP 1.353 TC 0.000 BP 0.000 IO 0.067	2 1.629 3 1.114 11 0.891 3 1.120	12 0.392 14 0.797 14 0.716 14 0.671
Def.2	AP 2.228 TC 0.785 BP 1.522 IO 2.093	4 1.156 13 0.830 13 0.748 11 0.788	9 0.649 13 0.830 13 0.748 12 0.775
Def.1	AP 2.228 TC 0.785 BP 1.522 IO 2.093	13 0.584 8 0.972 7 0.995 9 0.851	3 1.419 5 1.037 2 1.195 3 1.264
URINARY BLADDER	AP 1.461 TC 0.261 BP 0.539 IO 1.194	6 1.097 10 0.939 13 0.873 2 1.246	2 1.644 11 0.917 9 0.944 2 1.482
KIDNEY	AP 0.784 TC 0.130 BP 0.875 IO 0.897	5 1.119 4 1.081 4 1.106 4 1.090	7 0.825 4 1.070 6 0.991 8 0.913
HEART CONSTR.	AP 0.594 TC 1.439 BP 0.103 IO 0.917	12 0.609 5 1.048 9 0.944 8 0.961	13 0.386 8 0.928 8 0.957 10 0.779
TRIPLE HEATER	AP 0.734 TC 1.046 BP 0.618 IO 1.024	10 0.766 7 0.994 6 1.025 13 0.762	5 1.041 2 1.081 4 1.106 4 1.122
GALL BLADDER	AP 0.099 TC 2.616 BP 1.701 IO 0.243	1 1.689 2 1.308 1 1.330 1 1.683	1 1.727 2 1.081 4 1.106 1 1.635
LIVER	AP 1.081 TC 0.000 BP 0.219 IO 0.989	11 0.738 12 0.906 12 0.876 7 0.971	14 0.333 12 0.906 10 0.905 11 0.776
Exc.1	AP 0.115 TC 0.130 BP 0.834 IO 1.239	9 0.810 8 0.972 7 0.995 12 0.765	6 0.853 7 0.983 11 0.885 6 1.010

RAW DATA

VOLT 3 U

AP TC BP IO

LEFT FINGER 1

17.1 8.4 2118 2634

LEFT FINGER 2

28.8 9.4 2184 3421

LEFT FINGER 3

36.2 9.9 2030 3451

LEFT FINGER 4

23.9 8.3 1608 3074

LEFT FINGER 5

19.7 9.6 1732 3042

LEFT FINGER 6

52.7 10.2 1636 3541

LEFT FINGER 7

37.4 7.6 1373 2493

RIGHT FINGER 1

17.4 8.5 2184 3108

RIGHT FINGER 2

22.1 9.5 1533 2572

RIGHT FINGER 3

26.7 9.8 1819 2892

RIGHT FINGER 4

10.8 8.3 1661 2452

RIGHT FINGER 5

12.5 8.5 1757 2468

RIGHT FINGER 6

12.7 7.3 1314 2123

RIGHT FINGER 7

21.0 7.6 1373 2451

LEFT TOE 1

30.1 7.5 1732 2208

LEFT TOE 2

87.0 11.9 2440 5328

LEFT TOE 3

42.8 12.5 1928 3368

LEFT TOE 4

26.2 8.9 1826 2424

LEFT TOE 5

24.8 9.1 1881 2412

LEFT TOE 6

35.5 8.6 1682 3943

LEFT TOE 7

18.9 8.9 1826 2694

RIGHT TOE 1

13.5 8.5 2397 2386

RIGHT TOE 2

88.2 9.9 2030 5176

RIGHT TOE 3

39.2 10.8 1884 3398

RIGHT TOE 4

27.6 9.0 1625 3193

RIGHT TOE 5

33.7 9.9 2030 3551

RIGHT TOE 6

53.2 8.4 1732 4692

RIGHT TOE 7

45.9 9.5 2193 4881

Measured by:

Measurement date:

June 21st, 1983

Measurement
Conditions:

Usual condition

Subject name:

Ven Ayang
Rinpoche

Medical history:

Stomach ulcer
Kidney troubles

Current symptoms:

Stomach ulcer

Ave AP 20.4
Ave TC 7.1
Ave BP 1526 <
Ave IO 1411 <

STANDARD DEV.
AP 0.596
TC +0.202
BP +0.170
IO +0.378

FINGERS/TOES

AP +0.872 <
TC 0.964
BP +0.359 <
IO 0.939

LEFT/RIGHT

AP +1.579 >
TC +1.047 >
BP +1.054 >
IO +1.203 >

Figure 2

AMI Data (Usual Condition)
Subject: Ven. Ayang Rinpoche
Date: June 21st, 1983

19

Measurement date:

June 23rd, 1983

Measurement
Conditions:

Before ritual

Subject name:

Ven Ayang
Rinpoche

Medical history:

Stomach ulcer
Kidney troubles

Current symptoms:

Stomach ulcer

Ave AP 23.5
Ave TC 7.9
Ave BP 1945
Ave IO 2533 < 2152

STANDARD DEV.

AP +0.320
TC +0.101
BP 0.124
IO 0.298

FINGERS/TOES

AP 0.947
TC 0.943
BP 1.042
IO +0.716 < 0.7316

LEFT/RIGHT

AP 1.175
TC 0.984
BP +1.040 > 1.0910
IO +1.119 > 1.0795

AMI DATA SHEET

	DX	LN	RN
LUNG	AP 0.497 TC 2.240 BP 1.430 IO 1.355	7 1.109 14+0.740 4 1.007 13 0.610	3 1.207 9 1.016 1 1.200 6 0.977
Exc.1			
LARGE	AP 1.541 TC 0.017 BP 0.222 IO 0.559	2 1.401 8 1.054 3 1.088 7 1.040	9 0.049 10 0.953 4 1.059 9 0.009
STOMACH	AP 0.071 TC 0.919 BP 0.517 IO 1.030	4 1.270 1 1.142 10 0.965 3 1.326	4 1.244 6 1.029 10 0.895 4 1.045
SPLLEN	AP 2.394 TC 1.320 BP 1.104 IO 1.420	8 1.070 3 1.091 1 1.151 5 1.191	14+0.212 11 0.920 7 1.003 11 0.005
HEART	AP 0.972 TC 0.613 BP 1.323 IO 0.356	12 0.075 9 0.966 3 1.116 11 0.835	12 0.526 13 0.891 9 0.930 13 0.605
SHALL	AP 2.240 TC 0.715 BP 0.540 IO 1.189	14 0.582 10 0.941 13 0.090 12 0.633	1 1.304 6 1.029 13 0.017 7 0.954
Def.1			
URINARY	AP 2.133 TC 1.039 BP 2.663 IO 2.369	9 1.066 4 1.079 8 1.001 6 1.180	13+0.301 14 0.053 14 0.723 14 0.537
Imb.1			
Def.2			
KIDNEY	AP 1.043 TC 1.124 BP 1.169 IO 1.262	5 1.172 12 0.903 11 0.935 2 1.547	11 0.790 5 1.041 3 1.091 2 1.206
Inv.1			
HEART	AP 0.620 TC 0.613 BP 0.043 IO 0.493	13 0.611 13 0.020 12 0.093 14 0.564	10 0.036 12 0.903 6 1.006 12 0.697
Inv.2			
TRIPLE	AP 0.379 TC 0.204 BP 0.280 IO 0.111	10 1.040 2 1.104 9 0.904 10 0.906	8 0.904 3 1.079 5 1.022 8 0.936
GALL	AP 1.105 TC 0.400 BP 1.933 IO 1.776	3 1.346 8 1.029 6 1.007 4 1.309	7 0.921 9 0.970 12 0.020 10 0.029
Imb.2			
LIVER	AP 0.272 TC 1.021 BP 0.310 IO 0.920	1 1.461 6 1.041 4 1.096 1 1.770	2 1.363 1 1.167 2 1.139 1 1.521
Exc.2			
DIAPHRAGM	AP 0.165 TC 1.839 BP 1.162 IO 0.451	6 1.134 11 0.920 2 1.129 9 0.910	6 1.074 2 1.154 8 0.973 5 1.040
STOMACH	AP 0.474 TC 0.306 BP 0.479 IO 0.485	11 0.909 6 1.041 14 0.022 8 0.952	5 1.159 3 1.079 11 0.006 3 1.003

RAW DATA

VOLT	3	U
AP	TC	BP
IO		
LEFT FINGER 1	26.1	5.9 2116
LEFT FINGER 2	33.0	0.4 2110
LEFT FINGER 3	14.4	6.6 1730
LEFT FINGER 4	26.7	7.4 2197
LEFT FINGER 5	24.5	0.8 1915
LEFT FINGER 6	20.6	7.7 2171
LEFT FINGER 7	13.7	7.5 1732
RIGHT FINGER 1	30.3	0.1 2491
RIGHT FINGER 2	20.0	7.6 2060
RIGHT FINGER 3	19.7	7.2 1950
RIGHT FINGER 4	25.3	9.2 1894
RIGHT FINGER 5	21.3	0.6 1900
RIGHT FINGER 6	12.4	7.1 1026
RIGHT FINGER 7	32.6	0.2 1591
LEFT TOE 1	29.2	0.7 2240
LEFT TOE 2	34.4	0.3 2133
LEFT TOE 3	29.9	9.1 1077
LEFT TOE 4	23.3	0.3 1600
LEFT TOE 5	31.7	0.2 2116
LEFT TOE 6	27.6	7.2 1819
LEFT TOE 7	25.1	0.6 2103
RIGHT TOE 1	5.0	7.4 1952
RIGHT TOE 2	32.1	9.3 2216
RIGHT TOE 3	29.3	0.2 1742
RIGHT TOE 4	27.3	0.6 1725
RIGHT TOE 5	21.7	7.0 1612
RIGHT TOE 6	18.0	0.3 2124
RIGHT TOE 7	7.1	6.0 1400

Measured by:

Measurement date:

June 23rd, 1983

Measurement
Conditions:

After ritual

Subject name:

Ven Ayang
Rinpoche

Medical history:

Stomach ulcer
Kidney troubles

Current symptoms:

Stomach ulcer

Ave AP 20.9 (Inc.)
Ave TC 0.2
Ave BP 2059 (Inc.)
Ave IO 2006 (Inc.)

STANDARD DEV.

AP 0.491
TC +0.122
BP 0.149
IO +0.219

FINGERS/TOES

AP +1.042 (Inc.)
TC +1.144
BP 1.037
IO 0.950

LEFT/RIGHT

AP 1.010
TC 1.000
BP +1.070
IO +1.106

AMI DATA SHEET

	DX	LN	RN
LUNG	AP 0.464 TC 0.104 BP 0.671 IO 0.329	4 1.303 9 0.955 2 1.190 13 0.019	4 1.427 9 0.943 1 1.271 10 0.061
Exc.2			
LARGE	AP 0.167 TC 1.149 BP 0.940 IO 0.749	7 1.134 0 0.979 11 0.911 7 1.041	5 1.179 3 1.112 4 1.039 6 0.944
STOMACH	AP 1.201 TC 0.200 BP 0.053 IO 1.966	11 0.544 10 0.943 10 0.921 3 1.135	0 0.065 10 0.910 9 0.920 0 0.000
SPLLEN	AP 1.911 TC 2.194 BP 2.544 IO +3.226	9 0.017 4 1.051 7 1.005 4 1.091	13+0.306 14 0.797 14 0.741 14 0.672
HEART	AP 2.647 TC 0.313 BP +2.020 IO 2.177	6 1.109 6 1.039 3 1.156 8 1.040	11 0.402 7 1.003 11 0.774 12 0.757
SHALL	AP 0.604 TC 1.149 BP 1.624 IO 0.571	5 1.234 1 1.196 9 0.905 10 0.947	7 1.051 6 1.063 13 0.766 9 0.873
Def.2			
URINARY	AP 0.142 TC 0.522 BP 1.257 IO 1.337	14+0.240 12 0.906 4 1.130 11 0.939	14+0.210 11 0.046 8 0.960 11 0.766
-> N			
KIDNEY	AP 0.322 TC 2.507 BP 0.492 IO 1.373	10 0.745 14 0.822 5 1.106 2 1.427	9 0.031 3 1.112 4 1.039 2 1.249
-> N			
HEART	AP 0.204 TC 1.253 BP 0.754 IO 0.453	1 1.724 4 1.051 6 1.007 6 1.044	2 1.000 1 1.196 7 0.985 3 1.103
Inv.2			
TRIPLE	AP 1.601 TC 1.149 BP 1.670 IO 0.661	2 1.531 3 1.124 12 0.904 5 1.062	6 1.103 8 0.991 3 1.130 5 0.977
GALL	AP 0.204 TC 0.417 BP 0.398 IO 0.189	13 0.510 13 0.858 13 0.806 14 0.730	12 0.434 13 0.010 10 0.032 13 0.714
Def.1			
LIVER	AP 0.070 TC 1.567 BP 0.021 IO 0.197	3 1.441 7 1.015 1 1.235 1 1.540	3 1.676 1 1.196 2 1.230 1 1.515
Exc.1			
DIAPHRAGM	AP 2.092 TC 0.522 BP 0.104 IO 0.216	8 1.110 2 1.172 9 1.025 9 1.027	1 1.003 3 1.112 4 1.039 4 1.055
STOMACH	AP 0.516 TC 0.940 BP 0.621 IO 0.549	12 0.534 10 0.943 14 0.050 12 0.049	10 0.672 12 0.034 11 0.774 7 0.920

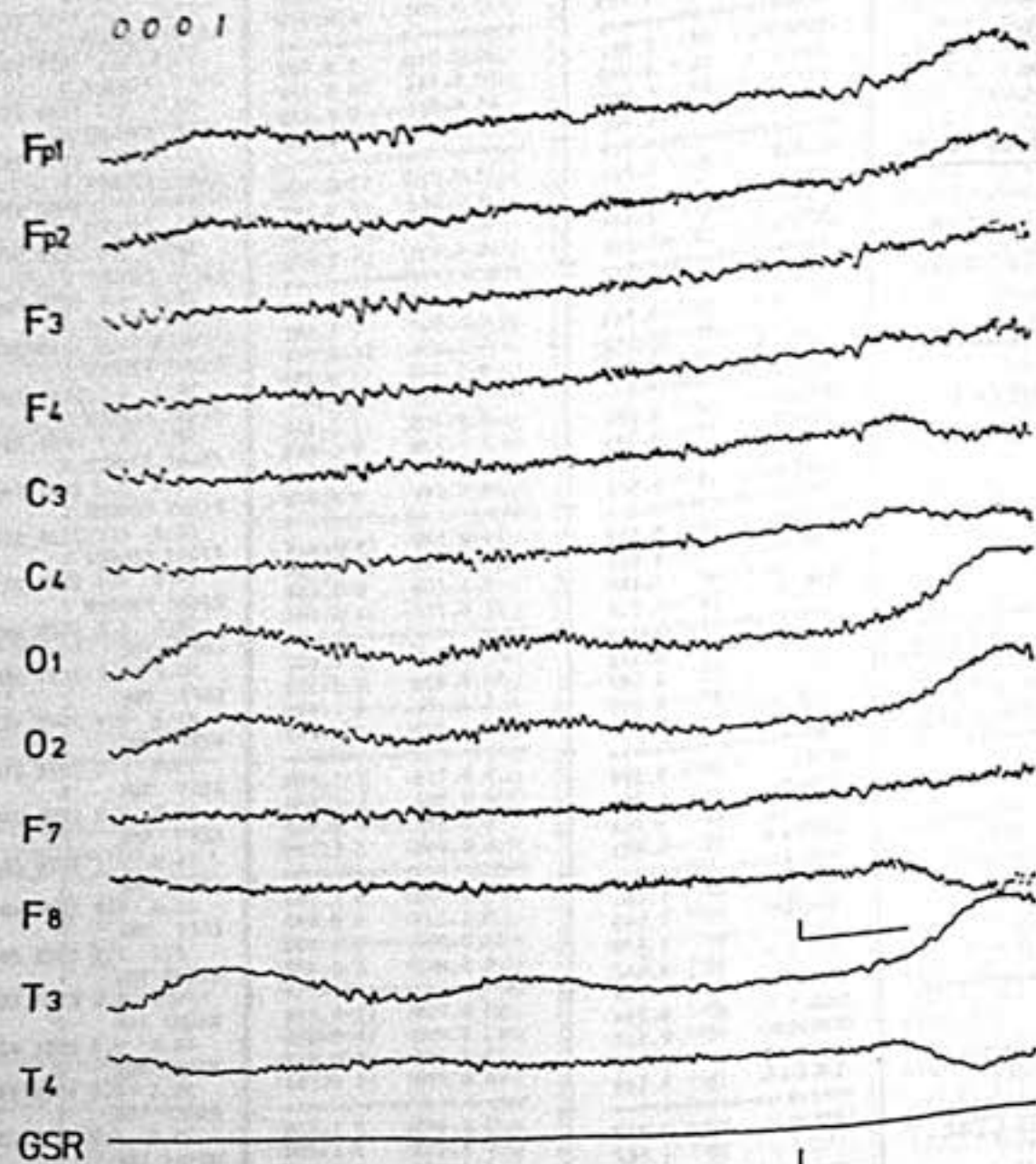
Measured by:

Figure 3

AMI Data Taken Before the Performance of the
Phowa Ritual
Subject: Ven. Ayang Rinpoche
Date: June 23rd, 1983

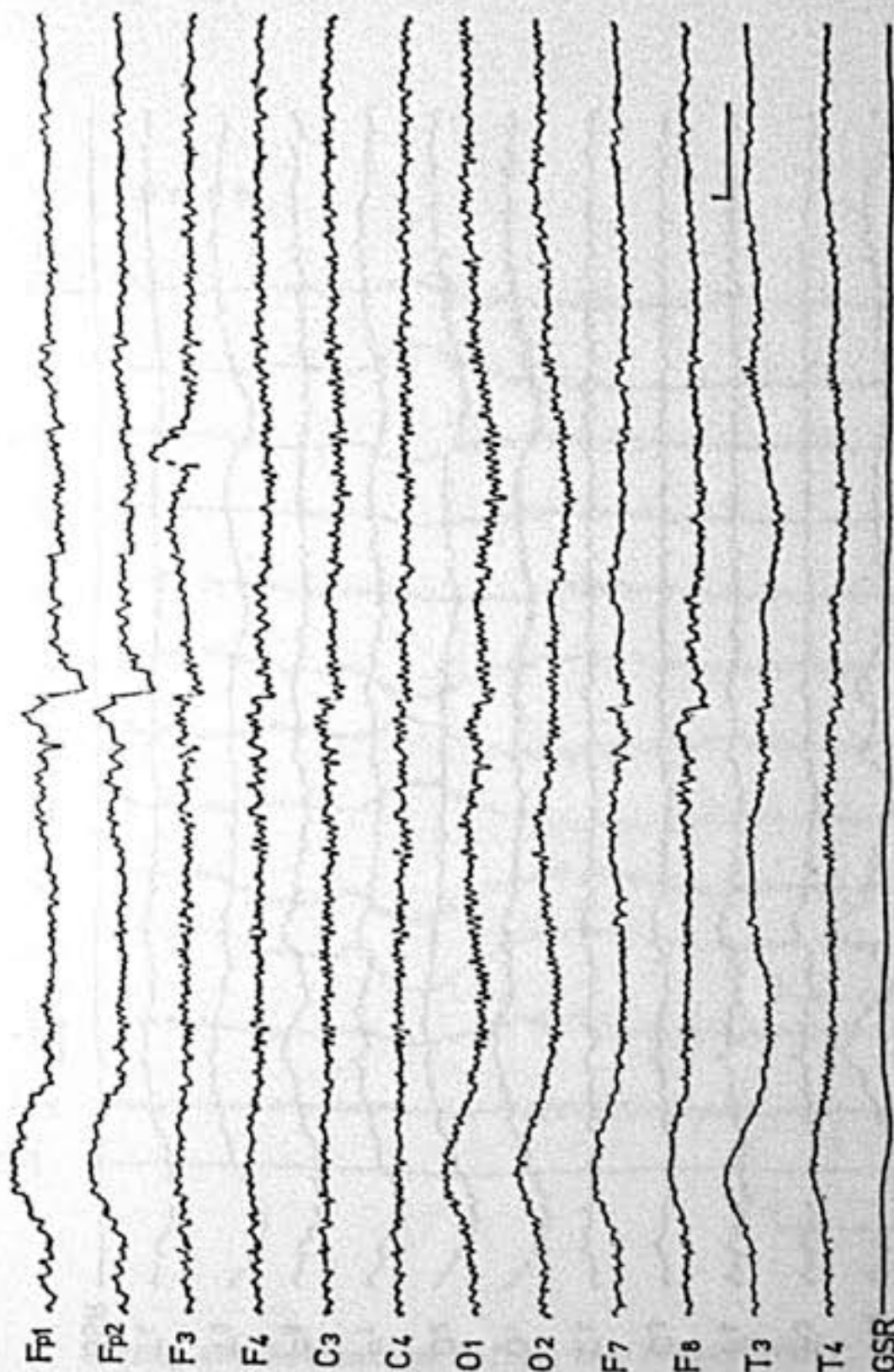
Figure 4

AMI Data Taken After the Performance of the
Phowa Ritual
Subject: Ven. Ayang Rinpoche
Date: June 23rd, 1983



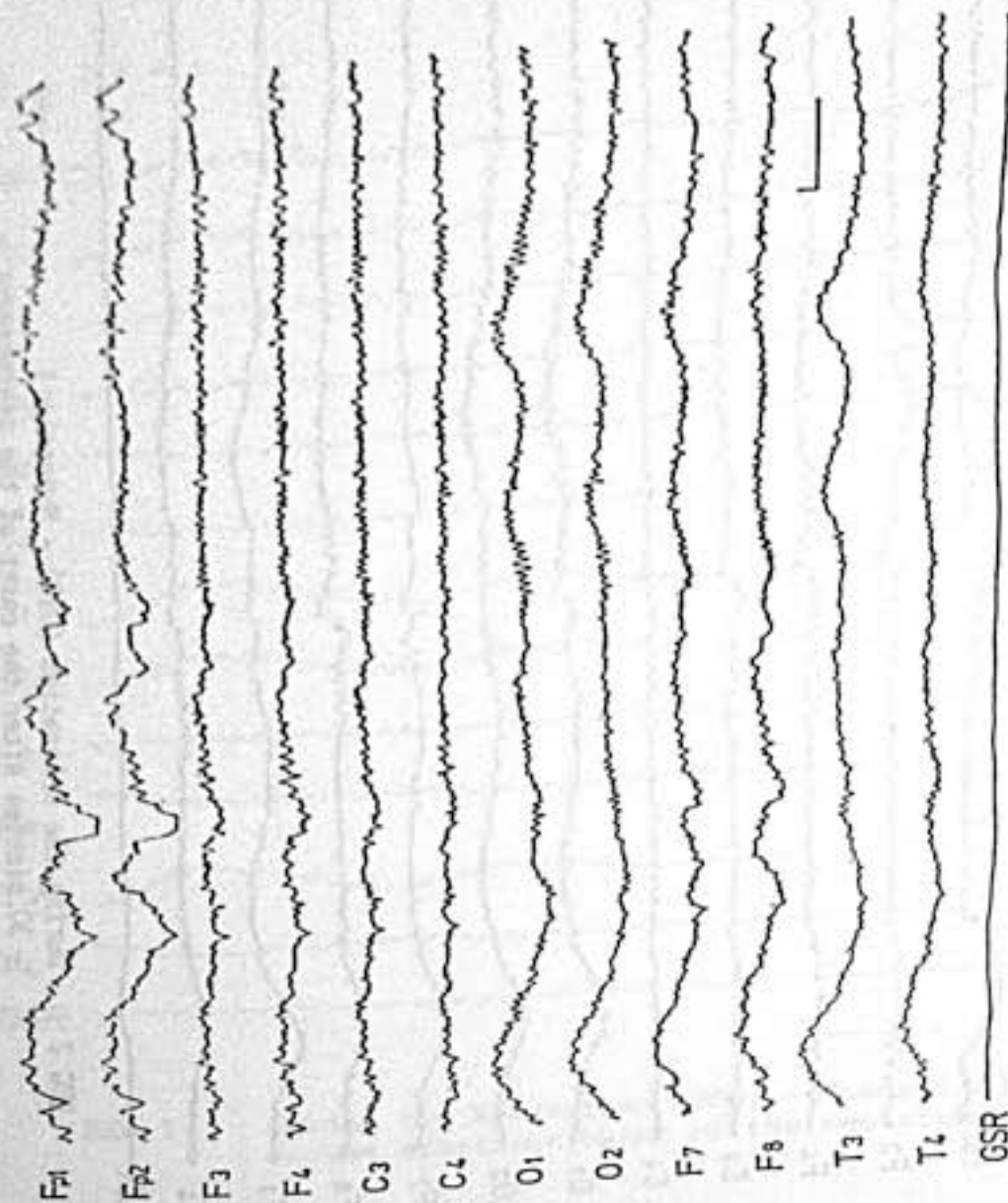
EEG 1 During the Relaxation (0001 - Monopolar)
- Just after the onset of the measurement -

0191



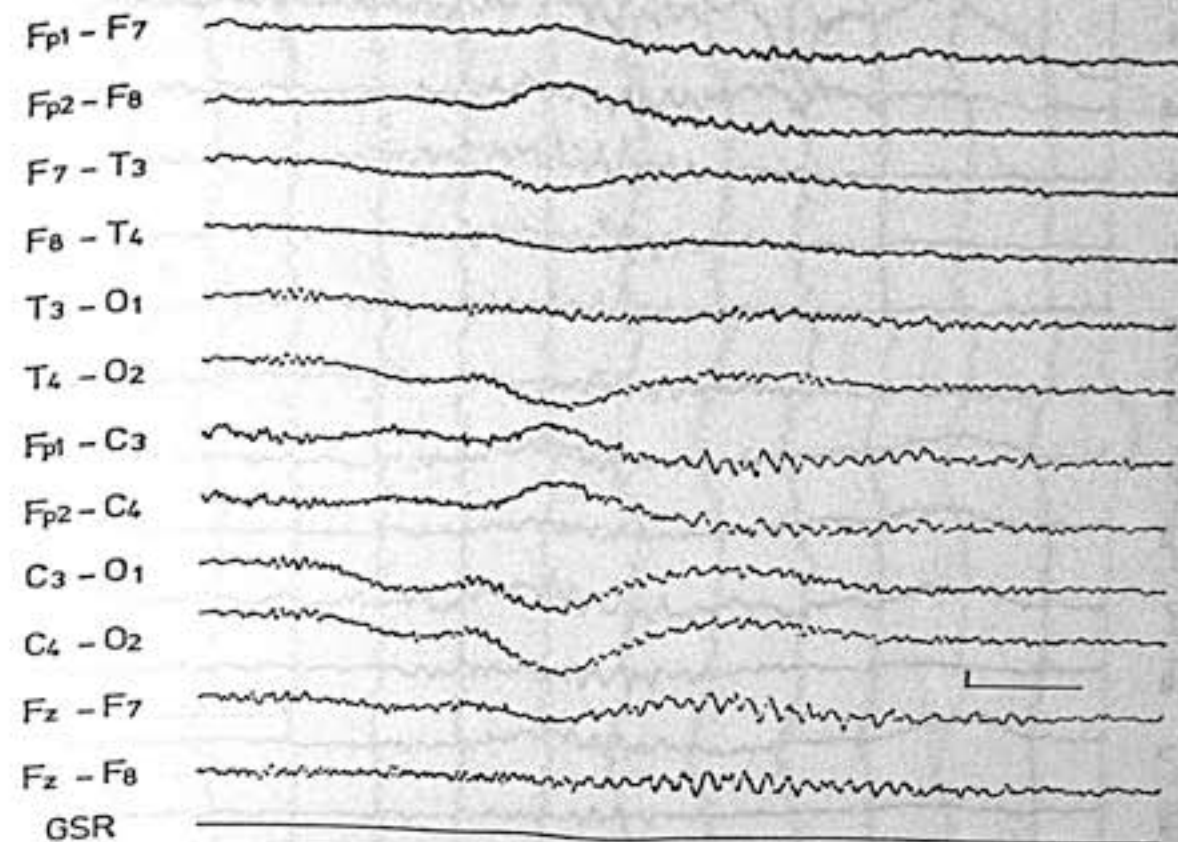
EEG 2 During the Relaxation (0191 - Monopolar)
- 30 minutes after the onset of the measurement -

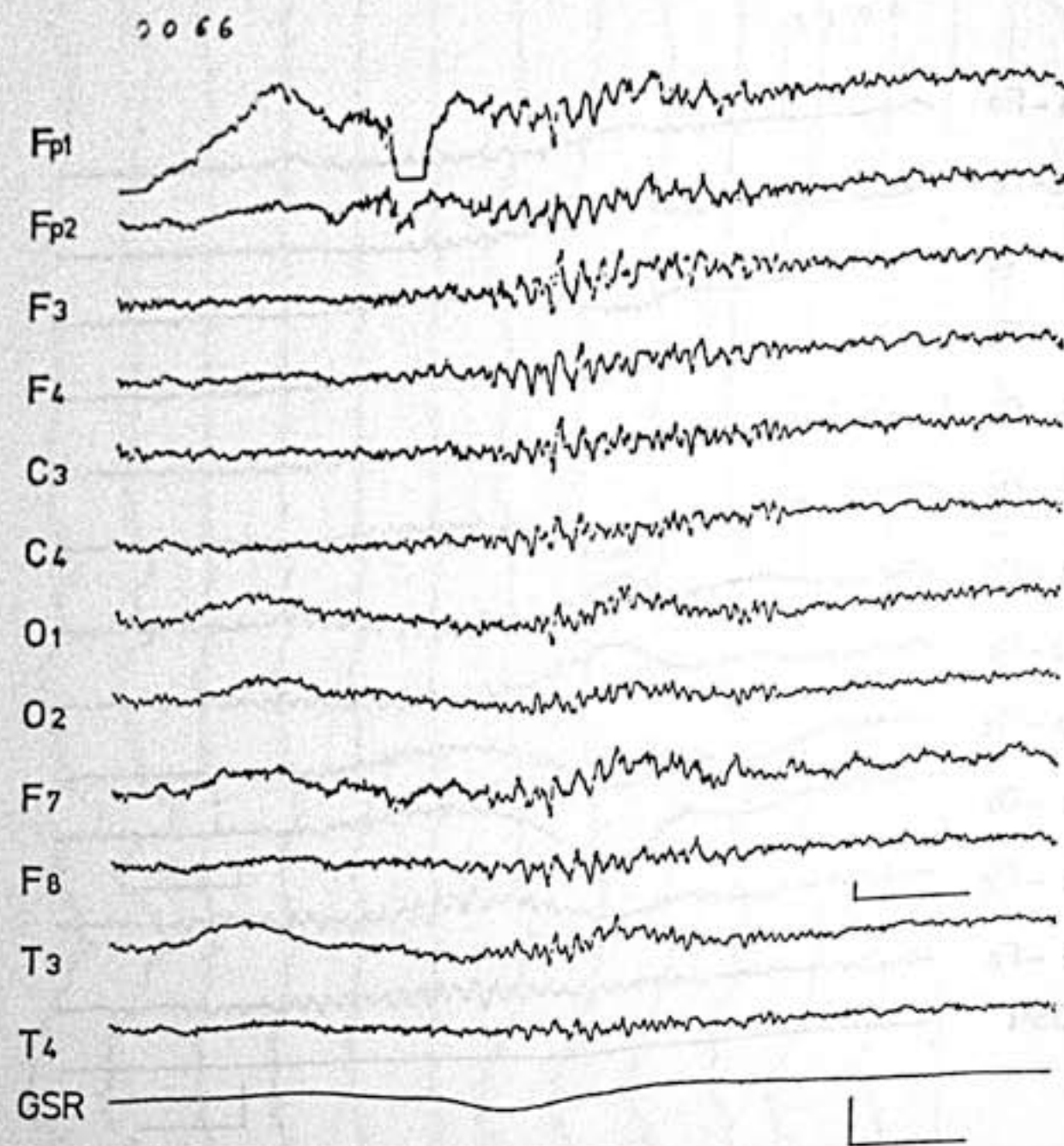
0120



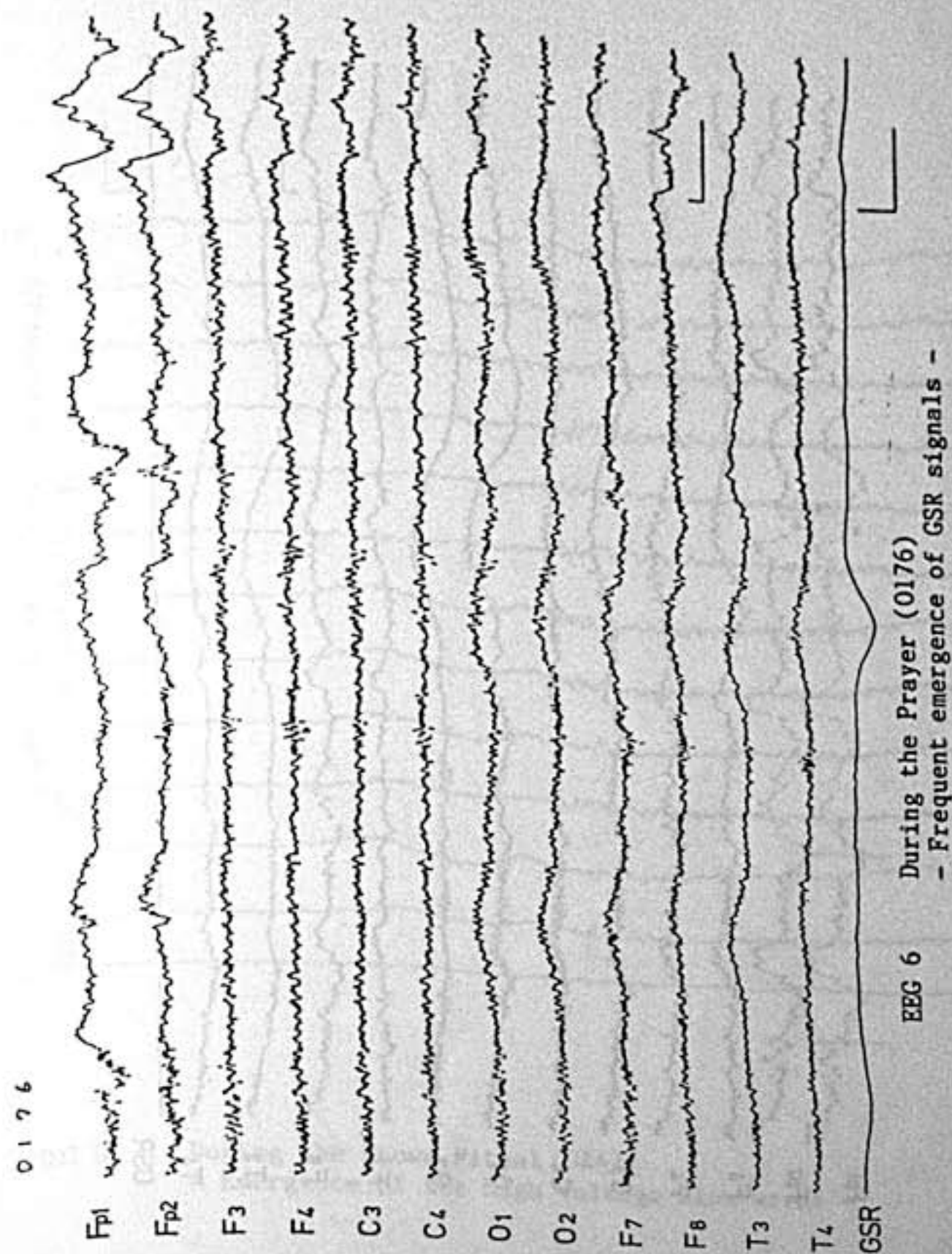
EEG 3 During the Meditation (0120)

0017

EEG 4 During the Relaxation Before the Prayer (0017, Bipolar)
- Emergence of the high voltage slow waves -

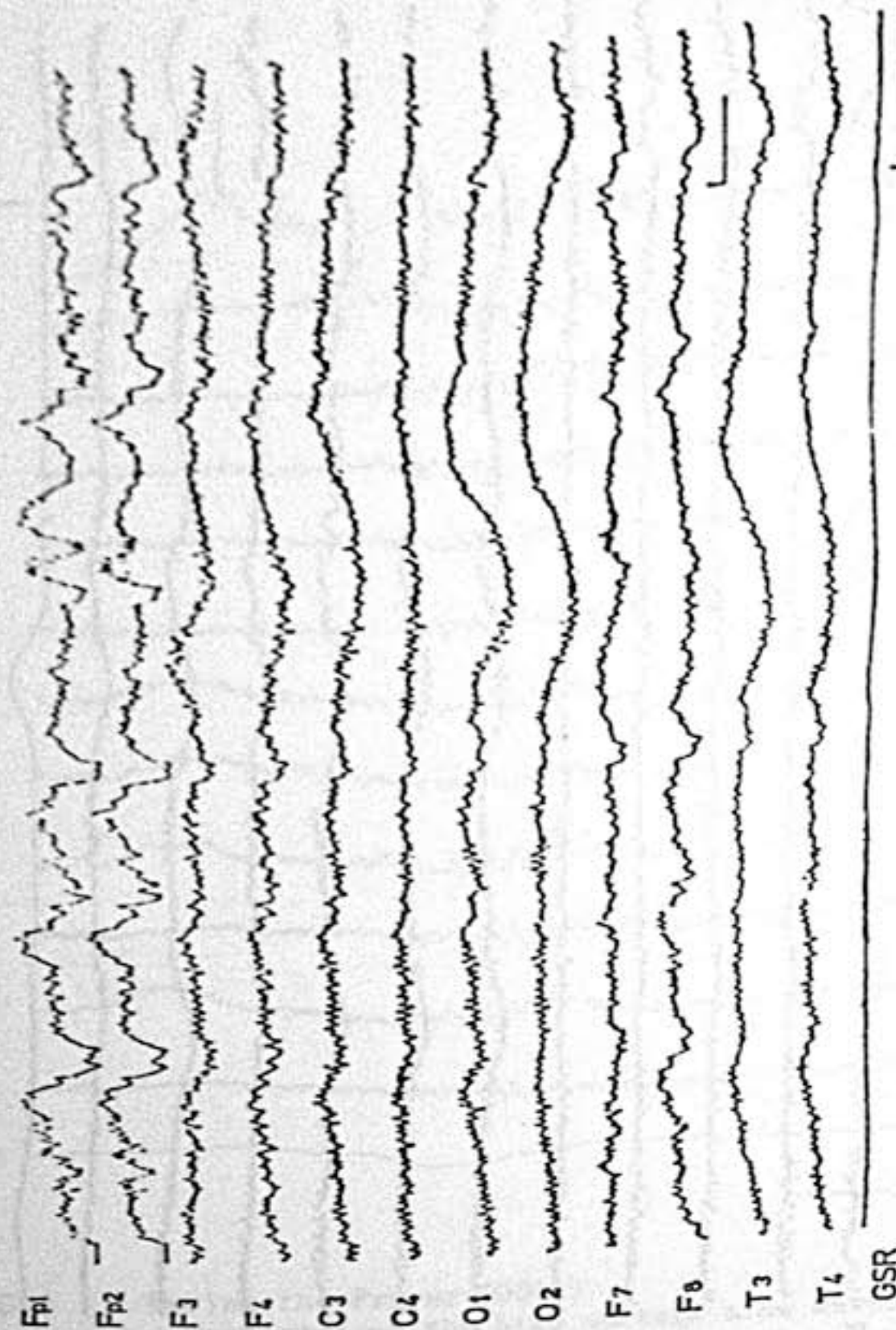


EEG 5 During the Prayer (0066)
- Emergence of the high voltage slow waves -

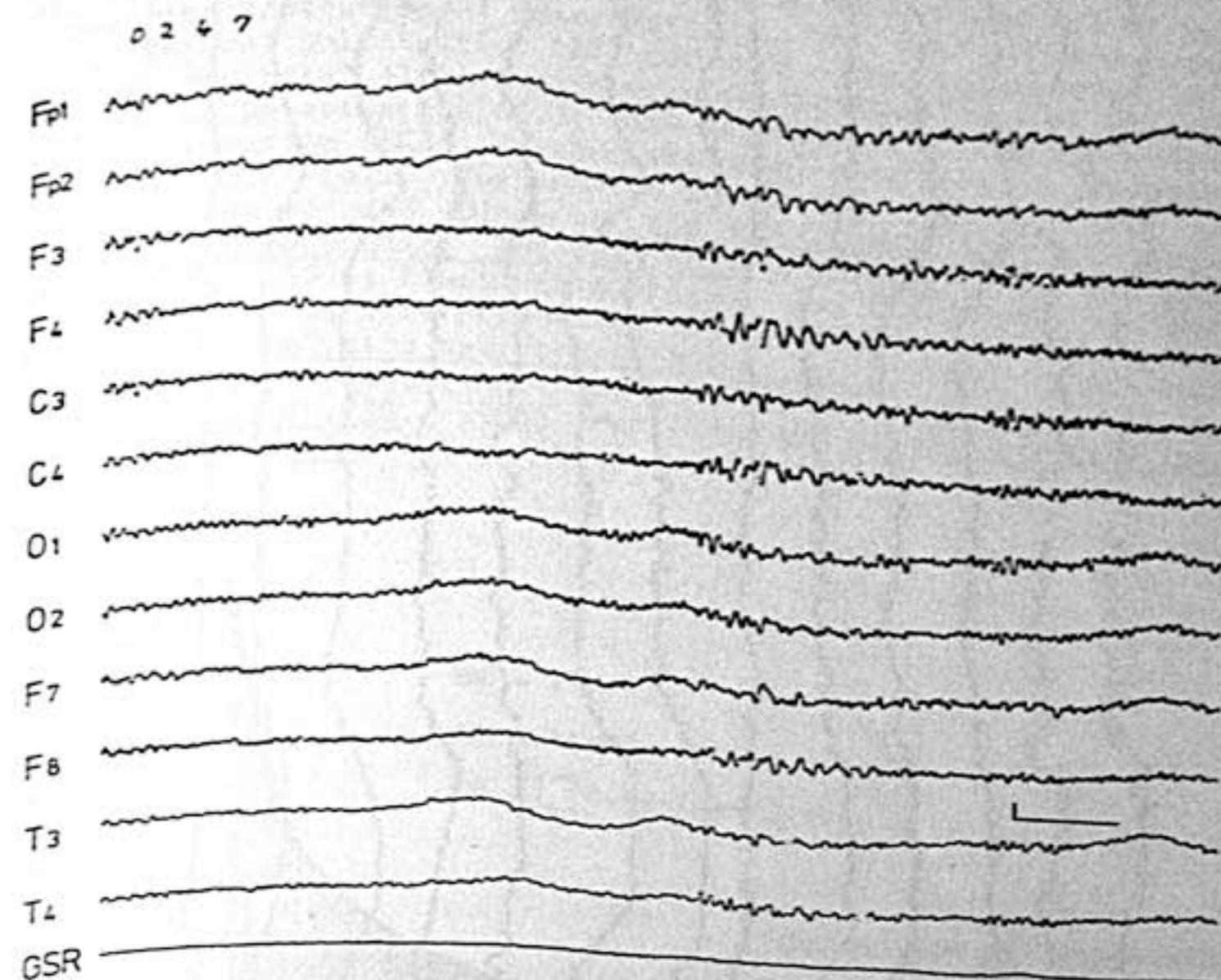


EEG 6 During the Prayer (0176)
- Frequent emergence of GSR signals -

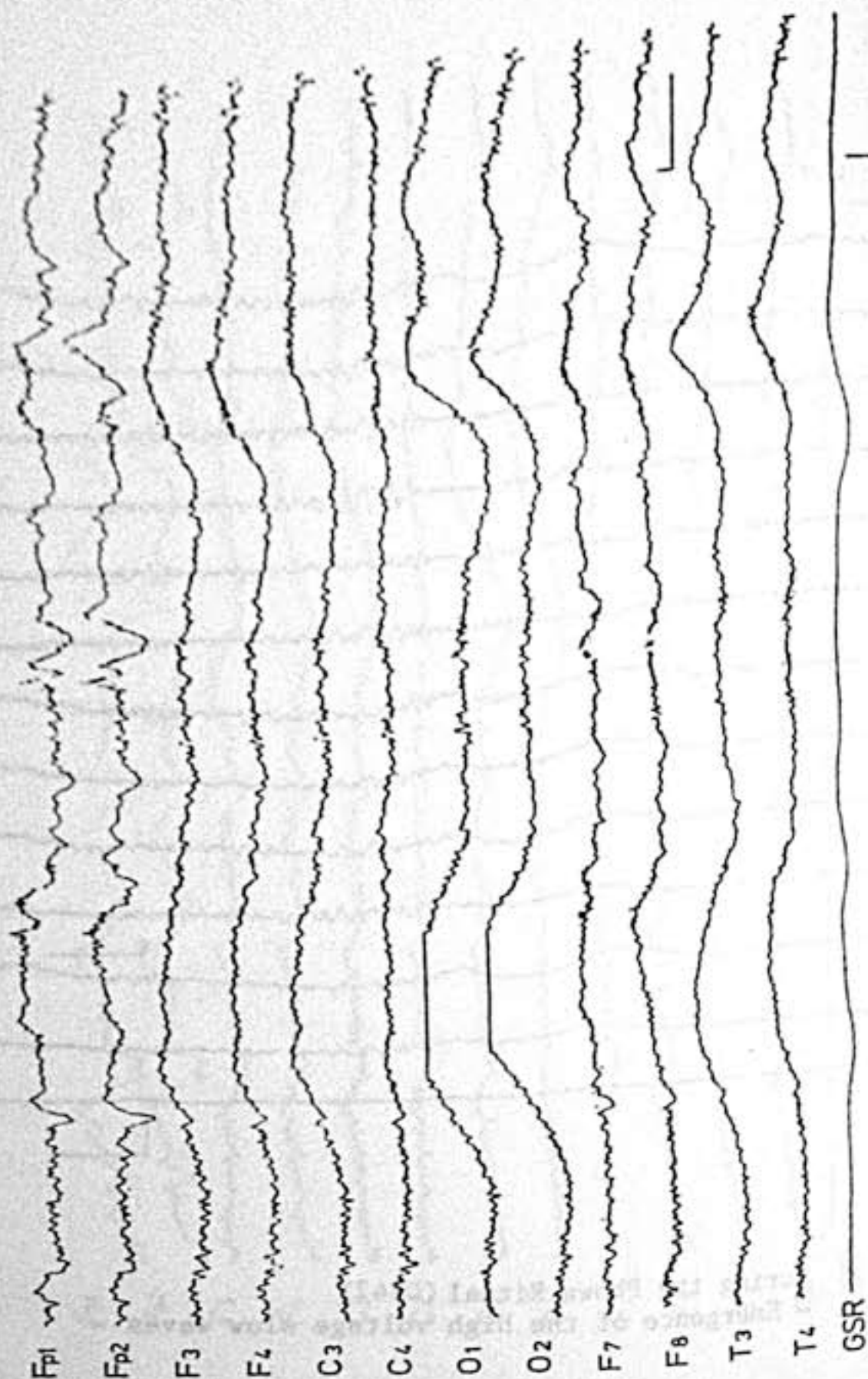
0179



EEG 7 During the Prayer (0179)
- Frequent recordings of eye movements -



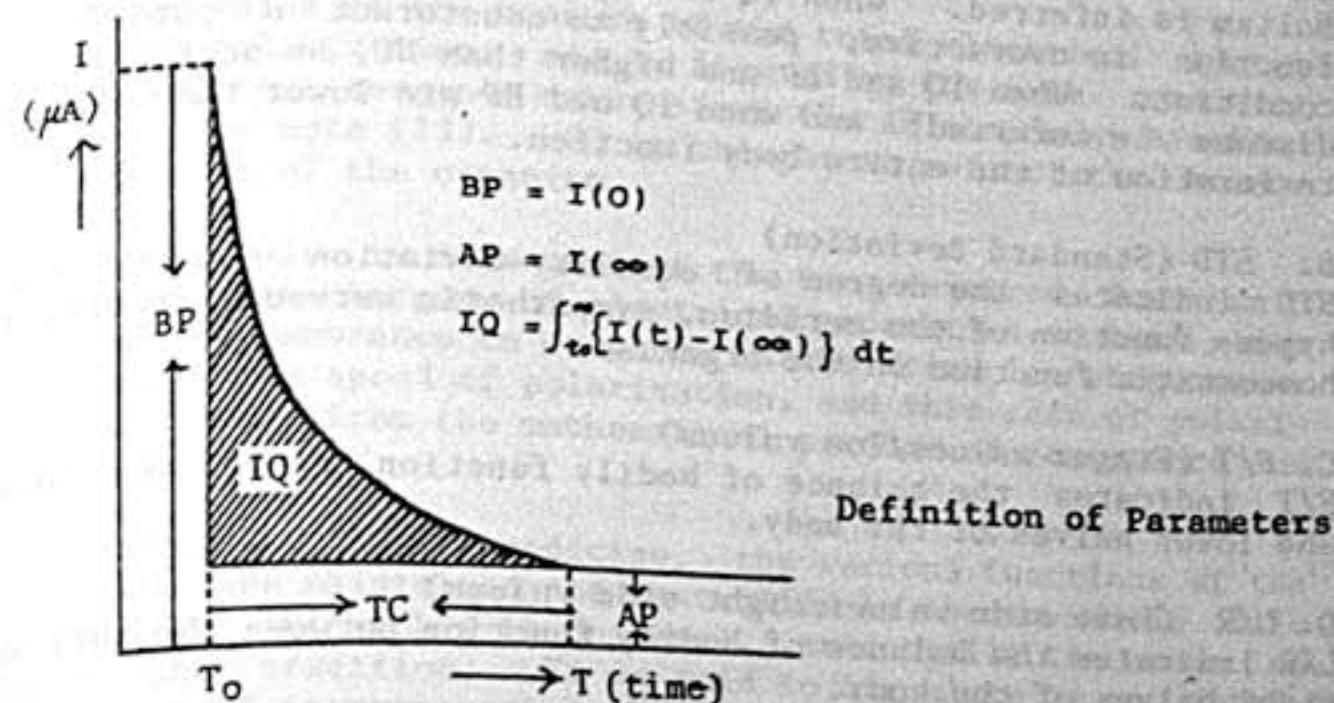
EEG 8 During the Phowa Ritual (0247)
- Emergence of the high voltage slow waves -



EEG 9 During the Phowa Ritual (0253)
- Recordings of eye movements and GSR signals -

<NOTES>

(1) The Apparatus for Measuring the Functioning of the Meridians and their Corresponding Internal Organs, devised and developed by the author. This apparatus monitors the electrical behaviour at the Sei (terminal) points of each meridian, located at the tips of the fingers or toes, against the externally applied stimuli: 3.0 Volt, 1msec square wave pulses. This behaviour is monitored as four parameters: the current value which flows before and after the generation of polarization at the barrier membranes, i.e. before polarization (BP) current; after polarization (AP) current the total electrical charge which accumulates at the conclusion of polarization (IQ); and the measure of the time taken for polarization (TC). Further explanation of these 4 parameters are in note (4). For details of the AMI, please refer to: How to Measure and Diagnose the Functions of the Meridians and the Corresponding Internal Organs, Institute for Religious Psychology, 1975; Electrophysiological and Preliminary Biochemical Studies of Skin Properties in Relation to the Acupuncture Meridians, Religion and Parapsychology No. 9, 1980; A Biophysiological Elucidation of the Meridian and Ki Energy, Religion and Parapsychology No. 10, 1981; Meridians and Ki, Religion and Parapsychology No. 16, 1986. (tr.)



(2) The AMI data taken while Rinpoche was in a state of relaxation, when he did not make any attempt to perform any spiritual ritual. (tr.)

(3) Parameters Which Indicate the Functioning of the Entire Organism

A. Averages

AVE AP (Average of all the after polarization values)
AP indicates the organism's condition at the time of measurement, especially the functions of the autonomic nervous and endocrine systems, in accordance with emotional and environmental conditions like climate and temperature at the time of the measurement. When AVE AP is lower than the Normal Criteria (NC), parasympathetic tonus is indicated; and when AVE AP is higher than NC, then sympathetic tonus is indicated.

AVE BP (Average of all the before polarization values)
BP indicates bodily defense against disease and is a parameter of meridian function. When AVE BP is lower than NC, a deteriorated state of meridian function is indicated; when AVE BP is higher than NC, a hyperactive state is indicated. (Many meridian-sensitive people show higher AVE BP than NC.)

AVE IQ (Average of all the integrated electrical charge)
IQ indicates the homeostatic ability of the organism. When AVE IQ is lower than NC, a decline in the homeostatic ability and metabolism is inferred. When IQ is higher than NC, the homeostatic function is overactive, possibly to counteract a pathological condition. When IQ and BP are higher than NC, an acute state of disease is inferred; and when IQ and BP are lower than NC, deterioration of the entire body function.

B. STD (Standard deviation)

STD indicates the degree of equality-deviation and hypo- and hyper- function of the meridian, sympathetic nervous systems, and homeostatic function in the organism.

C. F/T (Finger values/Toe values)

F/T indicates the balance of bodily function between the upper and lower halves of the body.

D. L/R (Left side values/right side values)

L/R indicates the balance of bodily function between the left and right halves of the body.

(4) 4 Parameters (AP, TC, BP, IQ) monitored with the AMI

BP: The BP value is the level of the initial peak current which travels between the electrodes in the skin structure after the application of the external potential (see the figure in note (1)). The duration of the BP current is less than $1\mu\text{sec}$ and it takes around $50\mu\text{sec}$ for the formation of polarization. Therefore

this initial high velocity current flows in the skin structure before the polarization potential is generated in the reverse direction to the externally applied potential. Approximately 70% of the BP current flows in the dermis, and the BP values are mainly determined by the physico-chemical environment of the dermal connective tissue, which is where the acupuncture meridians are thought to course. The BP is thus thought to serve as a parameter which reflects the condition of the meridians.

AP: The AP value is the steady-state direct current which continues to flow after polarization takes place. The current, due to the externally applied potential, cannot flow in the dermis after the completion of polarization because it acts as an effective resistance against the applied potential. After polarization at the barrier membranes, the current flows only in the epidermis for the most part, and the AP current is generally about 1/30 of the BP current. The AP current flows because the permeability of the barrier membranes is increased due to the stimulation by the externally applied potential. AP values have a mutual relationship to GSR measurements, and the AP value is thought to correspond with the functional state of the autonomic nervous system.

IQ: The IQ value is the measure of the total electrical energy to generate polarization, and is figured as the area remaining under the current-response curve after the AP component has been subtracted (see note (1)). IQ is thought to reflect the homeostatic function of the organism.

TC: The TC value is a measure of the time required for ionic movement and the charging of electrical capacities on both sides of the barrier membranes to complete the polarization phenomenon. TC represents the speed of polarization, and this rate of polarization is derived from the mathematical product of resistance and capacitance.

(5) According to Chinese medicine, the various functions of the human body are maintained and controlled by the invisible life force called 'Ki' (Ch'i in Chinese), essentially the same as prana in yogic tradition. Ki is said to circulate as an intricate system of interconnected channels, or meridians (twelve of which are considered as being major). When the flow of Ki as the meridians is smooth and balanced, the organism is healthy. If, however, Ki is blocked and becomes excessive or deficient along specific meridians, then a functional disorder in the corresponding organs and tissues results. A prolonged imbalance will bring about an organic disorder there.

The major meridians are bilaterally symmetrical, and there

is a specific coupling of meridians which form a particular Yin-Yang pair of the Yin-Yang relationship. The following is a list of the twelve major meridians and the Yin-Yang pairs. (tr.)

Yin Meridian		Yang Meridian	
Lung Meridian	_____	Large Intestine Meridian	_____
Spleen Meridian	_____	Stomach Meridian	_____
Heart Meridian	_____	Small Intestine Meridian	_____
Kidney Meridian	_____	Urinary Bladder Meridian	_____
Heart Constrictor Meridian	_____	Triple Heater Meridian	_____
Liver Meridian	_____	Gall Bladder Meridian	_____

(6) The relative rank of the functional level of the particular meridian among the 14 meridians (12 major and 2 independent) of an individual is indicated by the number assigned next to the L% (R%) values of each parameter of each meridian. The small numbers (1 - 3) in each parameter indicate a relatively excessive state of functioning, and the high numbers (12 - 14), a deficient state of functioning. As the BP value is the parameter of the Ki flow and its functioning:

(a) The meridians whose BP value is ranked 12 - 14th are classified as 'Deficient', indicating Ki deficiency and deteriorated functioning. The meridian which shows the lowest value in $(R\% + L\%)/2$ is defined as 'Most Deficient'.

(b) The meridians whose BP value is ranked 1 - 3rd are classified as 'Excessive', indicating Ki excess and excessive functioning. The meridian which shows the highest value in $(R\% + L\%)/2$ is defined as 'Most Excessive'.

(c) As was explained in note (5), there is a Yin-Yang relationship among the 12 major meridians. In the normal state of functioning, the BP value of the Yin pair is higher than that of the Yang pair. However, when their normal functional state is disturbed, the BP value of the Yang pair becomes higher than that of the Yin pair. This inversed competition of Ki and functioning is termed 'Inversed'.

(d) The meridian(s) which have a large bilateral imbalance in BP value between the right and left branches of the bilateral system are defined as 'Imbalance', indicating Ki and functional imbalance between the right and the left.

(7) I first encountered the word 'Chakra' around 30 years ago when was listening to a lecture on Yoga by the Rev. Kanzo Miura. I was given the strong impression that the chakras have a very important role in spiritual awakening, and that motivated me to start yoga practices: I got up daily at 3:00 a.m., did water ascetism and asanas, and sat for three to four hours after that.

Two to three months later, I started to feel a strong heat around the coccyx and a feverish sensation in the lower abdomen. A strong energy rose along the spine to the top of the head, sometimes slowly and sometimes very quickly. This energy left my body through the top of the head, and I had the experience that my whole existence was gradually expanding. Parallel with this experience, I saw a round red light in the abdomen, and a white shining light between the eyebrows. These lights were an extrasensory perception of the chakras. This experience was accompanied by extrasensory perception, such as seeing ghosts, past lives, and an intuitive understanding of others' minds.

Chakra means 'wheel of light' in Sanskrit. As one does religious practice, wheels of light are perceived at specific parts of the body. The following is taken as an explanation of the chakras from the Yoga-shikha Upanishad, which contains the most detailed passages concerning the chakras among the Upanishads:

The Svadhisthana chakra, which is hexagonal, lies at the root of the genitals. The wheel at the navel is ten-sided and is called manipuraka (the Manipura chakra).

(8) As the Before Polarization current value (BP) is the parameter of the functional condition of the meridians, the following discussion of the individual meridian is given based on the examination of the BP values.

(9) In yogic tradition, it is said that there is a correlation between specific organs/tissues and chakras, such as the 'The Muladhara and Svadhisthana Chakras control the urogenital system', 'The Manipura Chakra controls the digestive system', etc. On the other hand, the close connection between the organs/tissues and meridians is well-known and taught in acupuncture; for example, 'Disorder of the digestive system is in many cases reflected in the Liver, Spleen, Gall Bladder, Stomach, Large and Small Intestine meridians and treatment of these meridians is very effective for correcting the disorder.'

Dr Motoyama's long term study of acupuncture and yoga practice has led him to the conclusion that these two traditions are based on essentially the same energy system and are closely related. Furthermore, this close correlation between the chakras, organs/tissues and meridians has been scientifically studied with the AMI and other instruments, and substantiated at our Institute for Religious Psychology. The correspondence between them is tabled below for the readers' reference:

EEG MONITORED DURING THE PHOWA RITUAL

by Takeo Fujiki, M.D.

Chief researcher at the Institute
for Religious Psychology

Assistant Professor in the
Psychiatry Department, Nippon
Medical School

Many observations on the EEG monitored during Zen and Transcendental Meditation have been reported. There are differences in increases or decreases of α waves in the reports, depending on the stages of meditation which are monitored, but a tendency for slower wave patterns to appear and the emergence of θ waves during the meditation are common observations.

Although we use the general term 'meditation', this does not distinguish between the many different types of meditation. For example, the concentration on the chakras in yoga is not included in Zen. Thus, if the techniques differ and the depth of meditation differs, there must be some difference in the influences on the body due to the meditation. Banquet⁽¹⁾ reported changes in the EEG depending on the depth of meditation: 5 - 7 Herz high voltage θ waves were observed in the frontal electrode sites in the second stage of Transcendental Meditation, and the rhythmic β of the same voltage were observed at all the electrode sites in the third stage of the meditation. Mossis⁽²⁾ conducted psychophysiological measurements on subjects who had the ability to project the soul from the body, and reported that changes in EEG were not monitored during the out-of-body experiences. These differences in reports seem to suggest the difficulty in determining a common feature of physiological changes during the meditation which occur regardless of the

difference of techniques or the depth of meditation.

In this experiment the EEG of the Ven. K.C. Ayang Tulku Rinpoche was monitored before, during, and after his performance of the Phowa ritual (Note 1). When Rinpoche started meditation before the Phowa began, the α waves became predominant at all the electrode sites, compared with the EEG which had been taken during relaxation. Following this, the voltage of the α waves became larger and slow wave components increased in the frontal and parietal regions, synchronous with the increase of the voltage and prolonged cycle of the α waves. As Rinpoche began the Phowa session, high voltage slow waves (5 - 6 Hz, more than 100 μ V) were sporadically observed at the electrode sites corresponding to the pre-frontal association areas, especially at F_{p1} , F_{p2} , F_3 , and F_4 , which correspond to Broadmann's 9th, 10th, and 11th areas; and high voltage slow waves of 1 - 2 sec. duration were widely observed at all the electrode sites. At the same time, the successive emergence of signals of pendulum-like eye movements (0.5 - 1 sec. duration, slow and high amplitude) and GSR at the palms and all the electrode sites were observed. These were also observed during the prayer period prior to the Phowa session, but the eye movements and GSR signals became more frequent during the Phowa. These observations specific to the Phowa session, were recorded before and after Rinpoche's ejaculation of, "Hri, Hri...Phat" (Note 2), and corresponded to the spasmic conjugate deviation of his eyes.

Yamazaki⁽³⁾ has reported the eye movement signals which were recorded during yogic meditation: During the polygraph recording the subject experienced the feeling of inexpressible blessings when he saw a light which spread into a shining wheel. In the EEG monitored at this time, the α waves became predominant at all the electrode sites, α wave restraint was not observed at the occipital electrode sites even though light was perceived,

and signals of small up and down movements of the eyes were recorded until the end of the meditation. It was also reported that the signals of the small and quick horizontal eye movements were monitored while the mental tension increased, and the slow pendulum-like eye movements of 1 - 3 sec. duration during relaxation⁽⁴⁾.

A leading theory used to explain the mechanism of the emergence of the slow pendulum-like eye movements is that the intrinsic rhythm appeared in the oculovestibular system of the brainstem as the restraint was removed in the higher brain⁽⁵⁾. Hayashi and Yamamoto⁽⁶⁾ examined the connection between the injured area of the brain and patterns of EEG and EOG (electrooculograph, eye movements). They reported slow movements of the eyes were more commonly observed in patients with damage in the higher brain than the diencephalon, and more rarely in patients with damage in the lower brain than the mesencephalon. Miyasaka et al.⁽⁷⁾ monitored the EEG and EOG of glue-sniffers and reported that conspicuous recordings of groups of sporadic θ waves and successive signals of large and quick eye movements were recorded at the central electrode sites. They also reported that the period of recording of these conspicuous patterns corresponded to subjective reports of the period when the subjects had visual and auditory hallucinations during the measurement. Kennard⁽⁸⁾ experimentally verified that electrical stimulation towards Broadmann's 8th area generates conjugate movement of the opposite eye. It is clinically well-known that deviation of the head accompanied with conjugated deviation of the eyes are observed in patients with damage in the frontal lobe. Among the versive seizures observed in epilepsy, the oculo-gyric seizures which derive from the frontal adverse area in the frontal lobe during the attack are featured by spasmic conjugate deviation of the eyes alone.

Compared with the EEG monitored during the prayer period, the high amplitude slow waves increased, GSR and EOG signals were more frequently recorded, and spasmic conjugate deviation of the eyes was observed during the Phowa session. These observations indicate hypofunction of the cerebral cortex, especially Broadmann's 8th, 9th and 10th areas in the pre-frontal association areas, and excitation of the autonomic nervous center in the hypothalamus. Luria⁽⁹⁾ examined patients with tumors in the frontal association area and reported that the frontal association area is where time and space programming for intricate behaviour is performed. Actually patients with tumors in the frontal association area tend to make unrelated associations when they are shown an intricate picture and something to be noted is pointed out. (Normal subjects naturally turn their eyes to the point indicated.) Research with the EEG has verified that damage in the frontal association area causes high grade mental function and the level of consciousness to deteriorate. Therefore the hypofunction of the pre-frontal association area during the Phowa session suggests that conscious function ceased during the Phowa.

Concentration and meditation taught in the Oriental tradition alters the state of consciousness through voluntary effort and training, and enables the individual to awaken in a superconscious state beyond the limitation of individual existence. According to Motoyama⁽¹⁰⁾⁽¹¹⁾, when the superconscious state is awakened, the mind which has been functioning within the framework of individual existence stops its total dependence on the physical body (especially the brain), and starts to function in the wider realm of being beyond time and space. The psychophysiological changes which Rinpoche showed during the Phowa ritual suggest that mental function in the non-physical realm must be taken into consideration in the study of the correlation of the psyche and soma, and the attempts in brain

research to elucidate the nature of the mind.

Note 1: The subject, the Hon. K.C. Ayang Tulku Rinpoche, is a high-ranking lama of the Drikung Kagyudpa lineage in Tibetan Buddhism, and was 41 years old when this experiment was conducted at the Institute for Religious Psychology on June 23rd, 1983.

He came to Tokyo to participate in a convention held by the International Association for Religion and Parapsychology the same year. Two days after the convention, his EEG was monitored for over 4 hours and 20 minutes while he performed the Phowa ritual. This Tibetan Phowa ritual is said to be a direct method for reviving the high state of consciousness and for attempting to make a spiritual opening at the top of the head for transferring consciousness to a higher spiritual dimension at the moment of death.

The day of the experiment, he heightened this long ritual with the following process: relaxation before the prayer, prayer with relaxation and meditation in between, and the Phowa session with prayer and chanting and meditation in between.

Note 2: These words are uttered at certain points during the ritual when the practitioner attempts to send the consciousness up to and out of the opening in the head.

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ANALYSIS OF REAL CASES OF NEAR-DEATH EXPERIENCES

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In recent years, the study of the question of survival -- the continuity of personal consciousness after death -- has become increasingly prominent in both psychological and philosophical journals and conferences. There is a growing acceptance that we can gain a greater understanding of the nature of personhood and formulate meaningful (i.e. falsifiable) hypotheses about survival based on empirical studies. Clinical as well as anecdotal studies of near death experiences have become widely known. The death experience has been characterized in the popular mind by the images of dark tunnels, buzzing noises, "figures of light", and heavenly fields. The fact that many people have these sorts of experiences is now too widely established to be questioned, but the origins, meanings, and ontological status of these experiences are still widely debated by philosophers and psychologists. Experiences of tunnels, lights, nets, and buzzing ears may well be produced or explained by the chemistry of the brain. Other aspects of deathbed visions -- particularly their human content and apparent intentionality -- may be less easily explained away. This paper will take a closer look at some of the unique features of deathbed visions which tend to separate them from pure hallucinations and to indicate that events of significance to the survival hypothesis may be occurring here.

Visions of Departed Relatives or Friends

It is quite common for people having deathbed visions to "see" the face or figure of departed friends and relatives in their near death experience (NDE). Visions of mothers and spouses are apparently most common, comprising about half of the cases in which non-religious figures are "seen". These are followed by visions of siblings, children, and in American studies (but not Indian!), friends.

'The doctor gave me up, and told my relatives that I was dying. However, I was quite alert through the whole thing, and even as I heard him saying this, I felt myself coming to. As I did, I realized that all these people were there...who had passed on before. I recognized my grandmother and a girl I had known when I was at school, and many other relatives and friends. It seems I mainly saw their faces and felt their presence. They all seemed pleased. It was happy...'

Such appearances sometimes lead to dramatic changes in the character of the percipient, as in the case of a seven-year old boy dying of mastoid infection. He had been rebellious, refusing medicine and fighting the nurses. Then he had an NDE, in which:

'The boy insisted that Uncle Charlie (a doctor) came, sat beside him, and told him to take his medicine. He also told the boy that he would get well. The boy was very sure that Uncle Charlie had sat in the chair and told him these things. After this experience, the patient was cooperative. He was not excited, and he took the deceased doctor's "visit" as a matter of course. The next morning, the boy was much better -- a dramatic change had occurred in his condition.'

Aside from the conviction on the part of the perceiver that the person seen was "really there" and the fact that apparitions of dead relatives drastically outnumber those of the living relatives, there is nothing in these NDE's which would in itself indicate survival. It would be very easy to suggest that the dying man simply thought about other people who had died as he himself lay dying, and this concentration on dead friends led to their visualization.

There is an immediate answer to this skeptical hypothesis. It is clear in many cases that the dying patient had not been thinking about nor expecting to see such friends or relatives. Even more important, however, are the many instances in which the dying person "sees" deceased relatives whom he had not known to be dead (sometimes called "Peak in Darien cases"). An early, well-documented example is the case of Doris Clark B____, who saw her sister Vida as she was dying on January 12, 1924. Vida had died the previous Christmas day, but the fact had been carefully kept from her sister Doris, so as not to affect her condition. In other cases, the dying person provided information which was unknown to any of the people present of the death of a brother in India, Italy, Paris, or other distant locations. Indeed, such declarations that the dying person saw dead friends and knew that they were dead, were often taken as indications that the patients were hallucinating -- until later information confirmed that he had been correct about the fact of the prior death of his friend or relative.

Another curious commonality of the figures seen, aside from the fact that they are deceased, is that they generally exhibit an interest in "guiding" or "taking away" the patient. Typical of this phenomenon are instances like those of David and Harry:

'Harry died at Abbot's Langley on November 2, fourteen miles from

my vicarage at Aspley. David the following day at Aspley. About one hour before the death of the latter child, he sat up in bed, said distinctly, "There is little Harry calling to me."

or again, the dying words of tenor James Moore:

"There is Mother. Why, Mother, have you come to see me? No, no, I'm coming to see you. Just wait, Mother, I am almost over. I can jump it. Wait, Mother."

The apparent purposefulness of these bedside visions reminds us of the apparent purposefulness observed in other apparitions of the dead, and is an important difference from other hallucinations which tend to lack this characteristic quality.

Most impressive of NDE's, however, are the cases in which other people present in the room are also able to witness the presence of the departed relative(s) with his "take-away purpose". Nurse Joy Snell described her friend Laura Stirman's NDE:

'A short time before she expired, I became aware that two spirit forms were standing by the bedside, one on either side of it. I did not see them enter the room...But she recognized them immediately. A smile, beautiful to see, lit up her face. She stretched forth her hands and in joyous tones exclaimed, "Oh, you have come to take me away! I am glad, for I am very tired." As she stretched forth her hands, the two "angels" each extended a hand.'

Laubscher relates that in his medical practice, he has met many nurses who have

"...actually seen the joyous faces of the relatives of the de-

ceased who were dead, as if they gathered round with happy welcome to receive him."

Florence Marryat attests that she has seen the spirits of a patient's father and grandmother at a girl's passing. In yet another instance, Col. Cosgrave reported that he had seen an apparition of Walt Whitman (d. 1892) hovering over the bed of his dying friend Horace Traubel (d. 1919), who stated at the apparition of his long gone friend and said, "There is Walt!" Dr. Crookall also cites a number of such cases, which add yet another note of verification to the idea that these NDE's are closer to apparitions of someone having an OBE (objective) than to the subjective hallucinations of someone in delirium.

Next, in frequency to visions of departed loved ones are visions of religious figures, sometimes called "beings of light". Preliminary cross-cultural studies comparing Indian and American deathbed visions indicate that religious figures are "seen" far more commonly at Indian deathbeds than American. In the West, religious figures are usually identified as "God", "Jesus", "Mary", or "Saint ___", while in India, "Yama" (god of death) is most commonly reported, followed by Rama, Krishna, and other such mythological figures. Since no man has actually met God, Jesus, or Krishna as a fellow human in the 20th century, the identification of these figures is usually a superimposition of the perceiver. One girl had a throat implant and had been told that she would not be able to receive holy communion.

'I can see that form now: It had blond-gold hair, a very light beard and a moustache. It had a white garment on. And from this white garment there was all this gold shining. There was a red spot here (she points to her chest), on his gown, there was a chalice in his hand, and it said to me, "You will receive my body

within the week." And he went. And I thought to myself, "Well, that's funny."

The identification of the figure of light with Christ or God is often explicit, as in the now-famous case of Private George Ritchie, who died (temporarily) on December 20, 1943, later testifying:

'The light which entered that room was Christ: I know because the thought was put deep within me, "You are in the presence of the Son of God." I have called Him "light" but I could also have said "love", for that room was flooded, illuminated, pierced, by the most total compassion I have ever felt.'

On the other hand, there are many less religious people who have very similar experiences, but feel no need to label the apparitions with any particular name, referring merely to "a bearded man against a golden light."

It might be argued that these too are merely the final projections of the minds of the dying persons, which expect such religious comfort at death. If there were any such expectations, however, they must be on very subliminal levels, for there is no correlation between the religiosity of the percipients and the content of their vision -- except that religious patients more often give specific religious names to the "being of light". Moody relates:

'In quite a few instances, reports have come from persons who had no religious beliefs or training at all prior to their experiences, and their descriptions do not seem to differ in content from [those of] people who had quite strong religious beliefs.'

Even more surprisingly, Ring's detailed statistical surveys found that those most familiar with the literature of NDE's had the fewest visions, and those least expecting them had the most! Moreover, even in cases where the patient was highly religious, the percipient sometimes hesitated to identify the figure with a religious character, or was completely surprised by the appearance -- as in the case of a woman who thought she saw her patron saint Gerard, dressed like a monk with sandals, when she had always imagined him to be dressed in velvet finery. So visions are not merely dependent on the desires of the perceivers.

These religious "figures of light" seem to exhibit a purpose of guiding or conducting the dying person, as do apparitions of friends and relatives discussed above. While this comforted the majority of dying people, a large minority of the Indian subjects identified the apparitional figure as the god of death and were reluctant to "go with him". An Indian college graduate, for example, about to be discharged from the hospital suddenly shouted, "Someone is here dressed in white...I will not go with you!" He died ten minutes later. But such cases seem rather the exception than the rule. In most cases there is a distinct mood elevation, a serenity or even joy gained by the patient through his vision. And the purposefulness of the apparitions seems clear whether the percipient is pleased or afraid of the apparent intention.

As in the case of visions of deceased relatives, there are some instances in which third person observers in the sick chamber also witness the alleged visitor. In 1918, the Society for Psychical Research published the case of one Mr G___, who saw, "standing at the head of my dying wife, a woman's figure, seeming to express a welcome." A famous doctor of nervous and mental disease who was present did not witness the figure, but attested that there was no natural explanation for G___'s vision, and that

it could not be attributed to temporary hallucination. Others have reported observing "two white figures" or "white-robed figures, a man and a woman, wrapped their robes around her...They floated away." Animals in laboratory experiments sometimes are able to sense the presence of one having out-of-body experience (OBE) when humans cannot. A recent case where animals seemed to sense something was reported by an experienced male nurse:

'The patient, a Hindu policeman in his forties, was suffering from pulmonary tuberculosis...Suddenly he said "Yamdoot is coming to take me away. Take me down from the bed so that Yamdoot does not find me." He pointed upwards and outwards. "There he is!" its branches. Just as the patient had his vision, all the crows suddenly flew away from the tree with much noise, as if someone had fired a gun. We were very surprised by this and ran outside through an open door in the room, but saw nothing that might have disturbed the crows...It was as if they, too, had become aware of something terrible. As this happened, the patient fell into a coma, and expired a few minutes later.'

While such cases are not conclusive, they seem to be further evidence that NDE's share certain characteristics with OBE's; they are occasionally perceived by animals, psychics, and observers. Could it be that people become more psychically sensitive to such apparitions at death?

Visions of Another World

Last we shall consider NDE's in which dead or dying people report seeing, or travelling in heavenly "other worlds". Some patients explicitly identify this place as "heaven"; a majority, who find the experience pleasant enough, simply say, "So that's what it will be like", or "Now I know there is life after death."

The commonest imagery among visions of "other realms" is description of fields of flowers, gardens, or hills. Commander A.B. Campbell saw "a wide moor, with a well-worn track...to the brow of a hill", while temporarily left for dead. Dr Wiltse, whose case of temporary death was published in the St Louis Medical and Surgical Journal also saw scenes of trees and sky, and a path leading to a barrier of rocks. Some people feel themselves to be on a vessel on a large body of water, recognizing relatives on the far shore. Many see colorful sunrises or sunsets, or hear music of other worlds during their NDE's. Gates, some of rough-hewn stone, others of golden palaces or castles, are also very commonly reported, reminding us of the visions so widespread in ancient Chinese and Japanese literature of those who had been to heaven and back. Intellectuals and students sometimes have visions of a realm of "sculptors and philosophers, composers and inventors". In almost all cases, the imagery seen is imbued with a radiance of its own, glowing or emitting a warm, intense light.

There appears to be some "archetypical" similarity in the content of these visions, which is not significantly affected by the religious hopes or expectations of the dying patients. After detailed statistical analyses, Osis and Haraldsson concluded that

'Belief in life after death doubled the frequency of visions symbolizing death as a gratifying transition ($p=.003$), and responses with religious emotions ($p=.006$). Belief did NOT significantly change the frequency of experiences of beauty and peace and the frequency of images of another world. Apparently the belief in life after death changes very little of the afterlife images themselves, but rules the religious emotions and sharply increases positive valuation of death.'

Moreover, the frequency and content of these visions seemed

closely similar among reports from both Indians and Americans, Hindus, Christians and Jews.

In some cases, these visions of other worlds also include paranormal knowledge which can later be verified. Sometimes it is simply the sighting of relatives, not known to be dead, in this realm where many other dead (and no living) people are perceived. Janine Charrat, thought dead on December 18, 1961, saw visions of future events in her life, extremely contrary to both the laws of probability and to her own waking thoughts, but her life indeed evolved as she had foreseen in these visions. Serge Lama, by contrast, has visions of past lives, from which he apparently gained correct information about buildings and events which he could not have known normally. Many people dead or on the brink of death have visions in which they are told exactly when they will die, and their deaths follow these predictions even though their doctors have very different expectations. In one case, a girl who thought that she was bound by messengers of Yama actually exhibited rope marks on her legs after the experience. Apparently the unexpected vision of heaven's messengers had an intense, hypnotic-like effect on the subject's mind and body. Therefore, the question is not, "Were there invisible ropes actually binding her legs?", but rather, "What so altered her mind as to make her believe that she was bound by ropes, to the extent that they affected her body psychosomatically?" Deathbed visions of other worlds are not only interesting but important indications of survival to the extent that (i) they are intersubjective, not in being perceived by many people in the same room, but by their similarities which cut across cultural and religious boundaries; (ii) they produce information paranormally which is not otherwise known to the subject and can be verified; and (iii) they frequently occur after the patient has been pronounced dead, after which the patient again revives. The subjects' feelings

that they still have unfinished business to do on earth seems important for their revival in such conditions. There are exceptions to the above general picture. Some people hallucinate; others have visions of monsters, hell, or blackness. The point is less what other worlds they experience than that they cannot be dismissed as hallucinating, but demand careful study, which in turn may lead to a deeper understanding of man and the universe.

AFTERWORD

Part I of this Journal is the translation of case reports on psychophysiological changes observed during the performance of the Phowa ritual, written by myself and Takeo Fujiki, M.D. The experiment was conducted in 1983 at the Institute for Religious Psychology, with the cooperation of the Ven. K.C. Ayang Tulku Rinpoche from Tibet. Although these are case reports, they will provide an insight into psychophysiological changes when a transformation of consciousness is taking place.

Part II is a paper written by Carl B. Becker, Ph.D., who has researched near-death experiences both here in Japan and in the U.S.A.

I would like to take this opportunity to express my sincere thanks to the Ven. K.C. Ayang Tulku Rinpoche for his willing cooperation as a subject in the experiment, in spite of his fatigue from a long journey and participation in the IARP Convention; to Carl B. Becker, Ph.D., for his active cooperation in the IARP activities; and to Takeo Fujiki, M.D., who is specialized in the field of EEG and who has helped us in reading the EEG of the Rinpoche. Finally, I would like to thank Ms K. Kuratani, K. Kobayashi, Ph.D., Ms A. Butler, Ms R. Fujii, and Ms J. Young for their efforts in translating and editing this Journal.

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