

Review Article

Review on Recent Measurements of Anomalous Bio-Magnetic Fields

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(Received on December 10, 1998, Accepted on January 5, 1999)

*Journal of International Society of Life Information Science, Vol.17, No.1,
pp.20-25, March 1999.*

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Review on Recent Measurements of Anomalous Bio-Magnetic Fields

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Abstract: Studies have reported that some zen or qigong masters/students can generate nT to 100nT-order magnetic fields under their control. This review finds that the order of magnitude of reported anomalous bio-magnetic fields (from 10^{-1} nT to 10^6 nT) have often differed remarkably in papers from the last 11 years. Results, including the authors' own measurements for magnetic fields caused by human hands are discussed. It is suggested that the differences in the order of magnitude of the reported anomalous bio-magnetic fields are influenced mainly by three factors: the rarity of special subjects, so-called "psychics"; making measurements with or without local shielding of the magnetic field; and variations in the type of detection sensors.

Keywords: bio-magnetic field, nT, qigong, human hands, somatic science, PK, anomalous perturbation

1. Introduction

There are reports that a strong magnetic field from the human body is detectable¹⁻³⁾. However, the results were measuring a residual magnetic field (from 1 to 10^{-2} nT) of magnetic particles in the human lung after magnetizing by an external magnetic field (e.g. about 50 mT and about 10 s), therefore, they do not suggest that nT-order magnetic field from the human body is detected under ordinary situations.

Other reports⁴⁻¹³⁾ suggest that some zen or qigong trainees can generate a strong magnetic field under the subjects' control. These reports appeared in research for anomalous somatic functions, which started in the late 1970s¹⁴⁾. They reported that an

nT-order to 100 nT-order magnetic field is detected at the palms, forehead, top of the head, etc. Moreover, an anomalous strong magnetic field larger than that of geomagnetism often is detected. On the other hand, there have been only a few experts who could generate an nT-order magnetic field, even in the authors' experiments¹⁶⁾ and only one study on bio-magnetism with SQUID in which a 1.2 pT field could be detected¹⁵⁾.

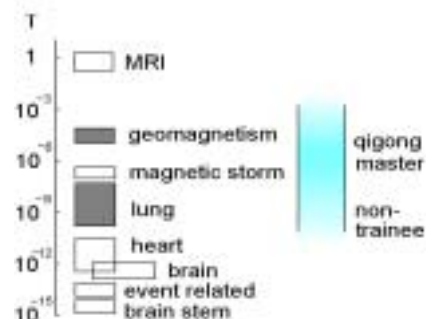


Fig. 1 Normal and Anomalous Magnetic Fields

Left: normal magnetic fields. Right: anomalous bio-magnetic fields reported from 1988 to 1998.

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Fig. 1 and **Table 1** summarize published results during 11 years from 1988 to 1998¹⁷⁾. The magnitude of reported anomalous bio-magnetic fields differ remarkably, being from 10^{-1} nT to 10^6 nT.

It is important to discuss the problem of whether the differences in magnitude of the anomalous bio-magnetic fields is based on filed properties or not.

2. Review of Reports

2.1 Subjects: Reports in **Table 1** by Xie⁴⁾, Fang et al.⁵⁾, Wang et al.⁶⁾, Shen et al.⁷⁻⁸⁾, Machi¹¹⁾, Hisamitsu et al.¹³⁾, were results for individual subjects. Except for Machi, detection of magnetic fields stronger than 10^2 nT were reported. Also the subjects often should anomalous phenomena such as turning the needle of a compass. For qigong master Liu, a steel plate which was set near the top of his head was bent during qigong. For qigong master Tan, he did not feel insertion of a needle during qigong. Experiments with Liu and Tan in Xie's report were done by Hansen Gu who was a researcher of an institute for nuclear science in Shanghai.

In reports using relatively big sample populations, there are two cases: magnitude of the magnetic field was smaller than 1 nT; a few subjects showed a strong magnetic field (Hisamitsu reported the results on certain subjects who were found in Seto et al.'s experiment¹⁰⁾).

2.2 Type of Sensors: Sensors in **Table 1** were a compass, magnetic media such as a floppy disc, a magnetic writing board, hole sensors, flux-gate sensors, magneto-resistive sensors, coils and SQUID.

Magnetic fields stronger than that of geomagnetism ($3 \times 10^4 - 5 \times 10^4$ nT) were detected by the magneto-resistive sensor (Xie⁴⁾) and the hole sensors (Wang et al.⁶⁾, Wu et al.⁹⁾). Shen et al.^{7,8)} reported that a read error occurred for a floppy disc after experiments, and that circle patterns (diameters of about 1.5 cm) were made on a magnetic writing board. Measurements with the

hole sensors (Shen et al.^{7,8)}) and coils (Seto et al.¹⁰⁾, Hisamitsu et al.¹²⁾) detected $10^2 - 10^3$ nT magnetic fields and measurements with SQUID (Xue et al.¹⁵⁾) and flux-gate sensors (Machi¹¹⁾, Kokubo et al.¹⁶⁾) reported even smaller magnetic fields than 1 nT. Wu et al.¹⁶⁾ experimented with SQUID and suggested these magnetic fields were caused by electrodermal activities on the subjects' hand skin¹⁸⁾.

The most sensitive sensor is SQUID, and the least sensitive sensor is the magnetic media or magnetic writing board. However, while SQUID did not detect a stronger magnetic field than that of geomagnetism, the magnetic media or magnetic writing board gave such results.

2.3 Shielding Magnetic Fields: Shen et al.^{7,8)}, Wu et al.⁹⁾, Xue et al.¹⁵⁾ and Kokubo et al.¹⁶⁾ used magnetic shielding in their experiments and the others did not. There were two ways for shielding: 1. experiments were done in a magnetic shielding room; 2. experiments used a local magnetic shield.

In measurements by Shen et al., experiments with the hole sensor were done in a magnetic shielding room. But, it seems that they did not use the magnetic shielding room for tests with the magnetic media or magnetic writing board, because they did not mention its use. They reported results with local magnetic shielding in which a hole sensor was shielded with a Permalloy board that had been rolled six times (**Fig. 2**). Anomalous bio-magnetic fields were detected for the non shielding condition, but not for the shielding condition. They considered that the anomalous bio-magnetic fields could be shielded.

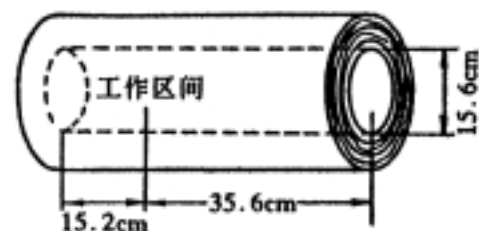


Fig. 2 Magnetic Shield with Permalloy Board Rolled Six Times (Shen et al. 8)

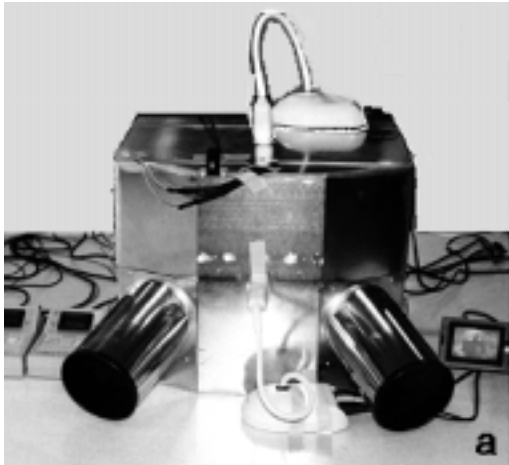


Fig. 3 Small Magnetic Shielding Case

The case is a double box type with Permalloy boards. Subject inserts his/her hands into the case through two tubes attached to the lower front of the case.

The local shielding test for part of a subject's body was only done by the authors. **Fig. 3** shows a small magnetic shielding case for the hands which they developed. Flux-gate sensors were set inside and outside the case. The test was done with nearly 70 Japanese non-trainees and about 15 Japanese

and Chinese qigong trainees (masters and students). The standard trial consisted of three parts: 1) 2-minute control (subjects' hands were keep still in the magnetic shielding case); 2) 2-minute qi-emitting (experimenters ordered subjects to emit qi while the subjects' hands were still); 3) 2-minute control. No anomalous bio-magnetic fields stronger than 1 nT were seen.

3. Discussion

In this part, differences in reported results among data from 1988 to 1998 are discussed.

3.1 Subject: There is a tendency for strong magnetic fields to be reported in experiments for individual subjects rather than for many subjects including non-trainees. Therefore, it is possible that strong magnetic fields ($> 10^2$ nT) can be detected only for a few special subjects.

3.2 Local Magnetic Shielding: Local shielding can help to identify sources of magnetic fields, for example, through comparison with inside and outside magnitudes of magnetic fields such as in the authors' test. And it can prevent tricks or eliminate artifacts (**Table 2**). However, except for the authors' study, local shielding for parts of a

Table 2 Examples Showing Identification of Magnetic Sources with Local Magnetic Shielding ¹⁶⁾

case	subject	year/ month	result
1	Qigong master A. He said he could turn the needle of a compass by waiqi emitted from his hand.	1997 April	There was a source of strong magnetic field in the subject's body which was not in his hands. The detected magnetic fields had its source near the subject's abdomen, based on manual scanning of the subject's whole body with a magnetic sensor.
2	Qigong master B. He said he could turn the needle of a compass by waiqi emitted from his hand.	1997 Nov.	There was a source of strong magnetic field in the subject's body which was not in his hands. The detected magnetic field had its sources near the subject's stomach and rectum, based on manual scanning of the subject's whole body with a magnetic sensor. The source near the rectum could not be detected after a break for lunch. In an interview after the experiment, the authors heard subject B had often swallowed some metal objects such as a small knife in qigong training.
3	Qigong master C. He said he could emit strong waiqi.	1996 Nov.	The subject's false teeth were the source of the magnetic field.

subject's body was not used. Therefore, in many studies, the reported positions when measuring a subject's body simply mean that sensors were set near there, not that the sources of any magnetic fields were there. It seems that anomalous magnetic fields are actually generated at other places than the reported positions actually if experiments are done without local shielding.

3.3 Sensors: Magneto-resistive sensors and hole sensors were used by Xie, Wang et al. and Wu et al. who reported stronger magnetic fields than 10^5 nT. These sensors can be affected by temperature and electric fields. The anomalous magnetic field (1.67×10^5 nT) which was detected in an experiment with the subject Liu to bend a steel plate, was considered as actually smaller. These cases suggested that reported "anomalous magnetic fields" included other factors with the true magnetic field, or that "anomalous magnetic fields" consisted of only other factors.

It was concluded that differences among magnitudes of reported magnetic fields were influenced by variations in types of sensors, which differ regarding their sensitivities to non-magnetic factors.

4. Conclusion

In results obtaining during 11 years from 1988 to 1998, it was concluded that differences in the magnitude of reported anomalous bio-magnetic fields were influenced mainly by three factors: rarity of special subjects, so-called "psychics"; use or no use of local magnetic shielding; variations in the type of detection sensors. Single or plural factors could give unexpected effects to the results. Further studies to resolve the problem of anomalous bio-magnetic fields need to consider these factors.

Acknowledgements

The authors express their sincere thanks to Mr. Tsuyoshi Hirata of NEC Corporation.

Part of this research was planned by the Science

and Technology Agency under the title "Study on Analyzing Methods of Human Body Functions Using Various Simultaneous Measurements", "Japan-China Joint Research for Anomalous Somatic Functions"¹⁹⁾ and "Japan-China Research Communication for Anomalous Somatic Functions" (Representative of each program is Mikio Yamamoto).

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Table 1 Examples of Results for Anomalous Bio-magnetic Fields from 1988 to 1998

Ordered by measurements for each report. Values of the magnetic field are ones during qigong.

Report	Year of Test	Sensor	Subject	Body	Result (Maximum value)	Remarks
Xie ⁴⁾	?	magneto-resistive	qigong master (Jinrong Liu)	top of head	1.67×10^5 nT	A steel plate (4 x 80 x 0.4cm) was bent during qigong.
	1978	magneto-resistive	qigong master (Qiaoqing Tan)	palm	1.25×10^5 nT	
	1986	magneto-resistive ?	qigong master (Zhu)	palm	4×10^5 nT	Subject could turn the needle of a compass.
Fang et al. ⁵⁾	1980	flux-gate ?	psychic (Yu)	hand	1×10^2 nT	Subject could stick a needle to her hand or lip. Test was done while the subject moved her hand.
Wang et al. ⁶⁾	?	hole, a coil	qigong master (Zhang)	palm	1×10^6 nT	Subject could turn the needle of a compass. Sensor was set on subject's palm.
Shen et al. ^{7,8)}	before 1991	compass	psychic (Chulin Sun)	palm, others	turned needle 30-40 deg	Subject could turn the needle of a compass.
	before 1991	magnetic media	psychic (Chulin Sun)	palm, others	data error, circle patterns	
	before 1991	hole	psychic (Chulin Sun)	palm	2.7×10^3 nT	In magnetic shielding room. Local shield was used too.
Wu et al. ⁹⁾	?	hole	20 qigong trainees, 6 non-trainees	palm	$11 \cdot 10^5$ nT (13 times) $2 \cdot 10$ nT (8 times) no signal (11 times)	In magnetic shielding room.
Seto et al. ¹⁰⁾	?	differential coil	37 qigong or zen trainees	palm	$2 \times 10^2 - 4 \times 10^2$ nT (3 persons)	
Machi ¹¹⁾	?	flux-gate	qigong master	hand	1×10^{-1} nT	
Wu et al. ¹²⁾	?	SQUID	non-trainees, qigong trainees	palm	non-trainees 8 mV^2 Group A 276 mV^2 Group B 92.3 mV^2 (*)	In magnetic shielding room.
Hisamitsu et al. ¹³⁾	?	differential coil	qigong trainee, zen trainee	palm	$8 \times 10^2 - 1.5 \times 10^3$ nT	
Xue et al. ¹⁵⁾	1990 – 1995	SQUID	qigong trainees, non-trainees	palm, others	1 nT	In magnetic shielding room.
Kokubo et al. ¹⁶⁾	1996 – 1997	flux-gate	qigong trainees, non-trainees	palms	(1 nT)	Local shield was used.

(*) Group B showed values of the magnetic field less during qigong as compared to the control.