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CONTENTS

HYPOTHESIS CONCERNING SOUL SUBSTANCE TOGETHER WITH EXPERIMENTAL EVIDENCE OF THE EXISTENCE OF SUCH SUBSTANCE.*

By Duncan MacDougall, M. D.

If personal continuity after the event of bodily death is a fact, if the psychic functions continue to exist as a separate individuality or personality after the death of brain and body, then such personality can only exist as a space occupying body, unless the relations between space objective, and space notions in our consciousness, established in our consciousness by heredity and experience, are entirely wiped out at death and a new set of relations between space and consciousness suddenly established in the continuing personality, which would be such a breach in the continuity of nature that I can not imagine it.

It is unthinkable that personality and consciousness continuing personal identity should exist, and have being, and yet not occupy space. It is impossible to represent in thought that which is not space occupying, as having personality, for that would be equivalent to thinking that nothing had become or was something, that emptiness had per-

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sonality, that space itself was more than space, all of which are contradictions and absurd.

Since therefore it is necessary to the continuance of conscious life and personal identity after death, that they must have for a basis that which is space occupying or substance, the question arises, has this substance weight; is it ponderable?

The essential thing is that there must be a substance as the basis of continuing personal identity and consciousness, for without space occupying substance, personality or a continuing conscious ego after bodily death is unthinkable.

According to the latest conception of science, substance or space occupying material is divisible into that which is gravitative—solids, liquids, gases, all having weight—and the ether which is non-gravitative. It seemed impossible to me that the soul substance could consist of ether. If the conception is true that ether is continuous and not to be conceived of as existing or capable of existing in separate masses, we have here the most solid ground for believing that the soul substance we are seeking is not ether, because one of the very first attributes of personal identity is the quality or condition of separateness. Nothing is more borne in upon consciousness, than that the you in you, and the me in me, the ego, is detached and separate from all things else—the non-ego.

We are therefore driven back upon the assumption that the soul substance so necessary to the conception of continuing personal identity, after the death of this material body, must still be a form of gravitative matter, or perhaps a middle form of substance neither gravitative matter nor ether, not capable of being weighed, and yet not identical with ether. Since however the substance considered in our hypothesis must be linked organically with the body until death takes place, it appears to me more reasonable to think that it must be some form of gravitative matter, and therefore capable of being detected at death by weighing a human being in the act of death.

The subjects experimented upon all gave their consent to the experiment weeks before the day of death. The experi-

ments did not subject the patients to any additional suffering.

My first subject was a man dying of tuberculosis. It seemed to me best to select a patient dying with a disease that produces great exhaustion, the death occurring with little or no muscular movement, because in such a case the beam could be kept more perfectly at balance and any loss occurring readily noted.

The patient was under observation for three hours and forty minutes before death, lying on a bed arranged on a light frame work built upon very delicately balanced platform beam scales. The patient's comfort was looked after in every way, although he was practically moribund when placed upon the bed. He lost weight slowly at the rate of one ounce per hour due to evaporation of moisture in respiration and evaporation of sweat.

During all three hours and forty minutes I kept the beam end slightly above balance near the upper limiting bar in order to make the test more decisive if it should come.

At the end of three hours and forty minutes he expired and suddenly coincident with death the beam end dropped with an audible stroke hitting against the lower limiting bar and remaining there with no rebound. The loss was ascertained to be three-fourths of an ounce.

This loss of weight could not be due to evaporation of respiratory moisture and sweat, because that had already been determined to go on, in his case, at the rate of one-sixtieth of an ounce per minute whereas this loss was sudden and large, three-fourths of an ounce in a few seconds.

The bowels did not move, if they had moved the weight would still have remained upon the bed except for a slow loss by the evaporation of moisture depending of course, upon the fluidity of the faeces. The bladder evacuated one or two drachmes of urine. This remained upon the bed and could only have influenced the weight by slow gradual evaporation and therefore in no way could account for the sudden loss.

There remained but one more channel of loss to explore, the expiration of all but the residual air in the lungs. Getting upon the bed myself, my colleague put the beam at actual

balance. Inspiration and expiration of air as forcibly as possible by me had no effect upon the beam. My colleague got upon the bed and I placed the beam at balance. Forcible inspiration and expiration of air on his part had no effect. In this case we certainly have an inexplicable loss of weight of three-fourths of an ounce. Is it the soul substance? How else shall we explain it?

My second patient was a man moribund from consumption. He was on the bed about four hours and fifteen minutes under observation before death. The first four hours he lost weight at the rate of three-fourths of an ounce per hour. He had much slower respiration than the first case, which accounted for the difference in loss of weight from evaporation and respiratory moisture.

The last fifteen minutes he had ceased to breathe but his facial muscles still moved convulsively, and then, coinciding with the last movement of the facial muscle, the beam dropped. The weight lost was found to be half an ounce. Then my colleague auscultated the heart and found it stopped. I tried again and the loss was one ounce and a half and fifty grains. In the eighteen minutes that elapsed between the time he ceased breathing until we were certain of death, there was a weight loss of one and one-half ounces and fifty grains, compared with a loss of three ounces during a period of four hours during which time the ordinary channels of loss were at work. No bowel movement took place. The bladder moved but the urine remained upon the bed and could not have evaporated enough through the thick bed clothing to have influenced the result.

The beam at the end of eighteen minutes of doubt was placed again with the end in slight contact with the upper bar and watched for forty minutes but no further loss took place.

My scales were sensitive to two-tenths of an ounce. If placed at balance one-tenth of an ounce would lift the beam up close to the upper limiting bar, another one-tenth ounce would bring it up and keep it in direct contact, then if the two-tenth were removed the beam would drop to the lower bar and then slowly oscillate till balance was reached again.

This patient was of a totally different temperament from

the first, his death was very gradual, so that we had great doubt from the ordinary evidence to say just what moment he died.

My third case, a man dying of tuberculosis, showed a weight of half an ounce lost, coincident with death, and an additional loss of one ounce a few minutes later.

In the fourth case, a woman dying of diabetic coma, unfortunately our scales were not finely adjusted and there was a good deal of interference by people opposed to our work, and although at death the beam sunk so that it required from three-eighths to one-half ounce to bring it back to the point preceding death, yet I regard this test as of no value.

With my fifth case, a man dying of tuberculosis, showed a distinct drop in the beam requiring about three-eighths of an ounce which could not be accounted for. This occurred exactly simultaneously with death but peculiarly on bringing the beam up again with weights and later removing them, the beam did not sink back to stay back for fully fifteen minutes. It was impossible to account for the three-eighth of an ounce drop, it was so sudden and distinct, the beam hitting the lower bar with as great a noise as in the first case. Our scales in the case were very sensitively balanced.

My sixth and last case was not a fair test. The patient died almost within five minutes after being placed upon the bed and died while I was adjusting the beam.

In my communication to Dr. Hodgson I note that I have said there was no loss of weight. It should have been added that there was no loss of weight that we were justified in recording.

My notes taken at the time of experiment show a loss of one and one-half ounces, but in addition it should have been said the experiment was so hurried, jarring of the scales had not wholly ceased and the apparent weight loss one and one-half ounces, might have been due to accidental shifting of the sliding weight on the beam. This could not have been true of the other tests, no one of them was done hurriedly.

My sixth case I regard as of no value from this cause. The same experiments were carried out on fifteen dogs, sur-

rounded by every precaution to obtain accuracy and the results were uniformly negative; no loss of weight at death. A loss of weight takes place about twenty to thirty minutes after death which is due to the evaporation of the urine normally passed, and which is duplicated by evaporation of the same amount of water on the scales, every other condition being the same, *e. g.* temperature of the room, except the presence of the dog's body.

The dogs experimented on weighed from fifteen to seventy pounds and the scales with the total weight upon them were sensitive to one-sixteenth of an ounce. The tests on dogs were vitiated by the use of two drugs administered to secure the necessary quiet and freedom from struggle so necessary to keep the beam at balance.

The ideal test on dogs would be obtained in those dying from some disease that rendered them much exhausted and incapable of struggle. It was not my fortune to get dogs dying from such sickness.

The net result of the experiments conducted on human beings is that a loss of substance occurs at death not accounted for by known channels of loss. Is it the soul substance? It would seem to me to be so. According to our hypothesis such a substance is necessary to the assumption of continuing or persisting personality after bodily death, and here we have experimental demonstration that a substance capable of being weighed does leave the human body at death.

If this substance is a counterpart of the physical body, has the same bulk, occupies the same dimensions in space, then it is a very much lighter substance than the atmosphere surrounding our earth which weighs about one and one-fourth ounces per cubic foot. This would be a fact of great significance, as such a body would readily ascend in our atmosphere. The absense of a weighable mass leaving the body at death would of course be no argument against continuing personality, for a space occupying body or substance might exist not capable of being weighed, such as the ether.

It has been suggested that the ether might be that substance, but with the modern conception of science that the

ether is the primary form of all substance, that all other forms of matter are merely differentiations of the ether having varying densities, then it seems to me that soul substance which in this life must be linked organically with the body, can not be identical with the ether. Moreover, the ether is supposed to be non-discontinuous, a continuous whole and not capable of existing in separate masses as ether, whereas the one prime requisite for a continuing personality or individuality is the quality of separateness, the ego as separate and distinct from all things else, the non-ego.

To my mind therefore the soul substance can not be the ether as ether, but if the theory that ether is the primary form of all substance is true, then the soul substance must necessarily be a differentiated form of it.

If it is definitely proven that there is in the human being a loss of substance at death not accounted for by known channels of loss, and that such loss of substance does not occur in the dog as my experiments would seem to show, then we have here a physiological difference between the human and the canine at least and probably between the human and all other forms of animal life.

I am aware that a large number of experiments would require to be made before the matter can be proven beyond any possibility of error, but if further and sufficient experimentation proves that there is a loss of substance occurring at death and not accounted for by known channels of loss, the establishment of such a truth can not fail to be of the utmost importance.

One ounce of fact more or less will have more weight in demonstrating the truth of the reality of continued existence with the necessary basis of substance to rest upon, than all the hair splitting theories of theologians and metaphysicians combined.

If other experiments by other experimenters prove that there is a loss of weight occurring at death, not accounted for by known channels of loss, we must either admit the theory that it is the hypothetical soul substance, or some other explanation of the phenomenon should be forthcoming. If proven true, the materialistic conception will have been fully

met, and proof of the substantial basis for mind or spirit or soul continuing after the death of the body, insisted upon as necessary by the materialists, will have been furnished.

It will prove also that the spiritualistic conception of the immateriality of the soul was wrong. The postulates of religious creeds have not been a positive and final settlement of the question.

The theories of all the philosophers and all the philosophies offer no final solution of the problem of continued personality after bodily death. This fact alone of a space occupying body of measureable weight disappearing at death, if verified, furnishes the substantial basis for persisting personality or a conscious ego surviving the act of bodily death, and in the element of certainty is worth more than the postualtes of all the creeds and all the metaphysical arguments combined.

In the year 1854 Rudolph Wagner, the physiologist, at the Gottingen Congress of Physiologists proposed a discussion of a "Special Soul Substance," the challenge was accepted, but no discussion followed, and among the five hundred voices present not one was raised in defence of a spiritualistic philosophy. Have we found Wagner's soul substance?

CORRESPONDENCE.

The newspapers have recently contained a good deal of matter with reference to the problem of "weighing a soul," and have so misunderstood and misrepresented the work of Dr. Duncan MacDougall that we have offered to him the space for a correction of them. It will be apparent to any reader that Dr. MacDougall has not made any such extravagant pretensions as those ascribed to him by the papers, and it is with a view to removing the false impression which newspapers invariably give that the matter has been taken up here. The Editor of the *Journal* does not share the hopes which many entertain regarding the possibility of "weighing a soul," but this does not preclude his recognition of the value of experiment, whatever its outcome. The main point is to have a definite conclusion established, whether it be negative or affirmative.

The following letter was received from Dr. McDougall soon after the story appeared in the papers. It explains itself. It is followed by the correspondence between himself

and Dr. Hodgson, which occurred some years ago, and before the latter's death. Both will make clear the scientific attitude maintained in the problem.

Haverhill, Mass., March 13th, 1907.

Dr. James H. Hyslop:

Dear Sir:—I thank you for your interest in the experiments. It is unfortunate that they have received publicity first through the newspapers, as it was my intention to collect the data and complete my argument in a paper to be made public before some scientific body. That I judge, is out of the question now. The premature publication is unfortunate because of another matter. I had lately become connected with a hospital and was thereby winning the confidence of those in charge, and hoped that within this year I might be able to resume my experiments. This premature newspaper publication ends that hope. In response to your letter and also at the suggestion of Miss Lucy Edmonds, the former Secretary of the late Dr. Hodgson, I enclose a typewritten copy of my communications with Dr. Hodgson, with the request that some time you will return them. You may make copies of them if you like. These communications to Dr. Hodgson contain practically the whole substance of my experiments. The salient features of the whole matter are as follows:

1. We did find by rigid experimentation a loss of substance from the body *not accounted for by known channels of loss,* occurring at death, in some cases exactly coinciding with death, in others shortly after death.

2. The loss of substance was from three-eighths or one-half an ounce, up to one and one-half ounces.

3. In the first case we had ideal conditions, viz.: no friction on the part of officials of the institution, and opportunity of watching the patient four hours before death. The movement of the beam in his case was remarkable. It dropped to the lower bar with a thud exactly at the moment of death. In the other cases we had more or less friction on the part of officials which worried me very much. In the case of the woman this friction and annoyance were so great, that I threw that test out. In one other case the patient was on the scales just a few minutes before death, and while in the communication which I made to Dr. Hodgson I have written there was no loss of weight in that case, I should have written that there was more than two ounces in fact, but the whole thing was done so hurriedly in this case, that I was dissatisfied, though the weight might have slipped, or the beam, and so I threw out the experiment.

4. All the cases with the exception of the woman, died of

tuberculosis. Consumptive cases were selected because they fulfilled the conditions requisite for a delicate test to a nicety, *i. e.*—a consumptive dying after a long illness wasting his energies, dies with scarcely a movement to disturb the beam, their bodies are also very light, and we can be forewarned for hours that a consumptive is dying.

5. In the case of animals (dogs) the results of the tests were negative, but I have this to say, that the tests on the dogs were vitiated by the necessity of using two drugs in order to secure the necessary muscular relaxation—quiet and stillness, so that the beam would remain at balance. They were all healthy dogs. The ideal dog test or other animal test would be that of one dying of an illness, that produced great exhaustion and no muscular movement. Of course a theory preceded the experiments and some are foolish enough to think that because I had a theory to begin with I would be therefore a biased observer. I hardly think so.

If personal identity (and consciousness and all the attributes of mind and personality) continue to exist after the death of the body, it *must exist as a space-occupying body,* unless the relations here in this world between the conscious ego and space, our notions of space as fixed in our brain by inheritance and experience are wholly to be set aside and a new set of space relations to consciousness suddenly established, which would be such a breach in the community of nature that I cannot imagine it. At any rate we are now limited to the conception that for personal identity or personality, or individuality, to exist and have being, is only possible in a space-occupying body. To think of personal identity or personality existing and yet not occupying space, is equivalent to thinking that something can be nothing or if not that absurdity, then the equal absurdity that space and personality are one and the same thing. If we continue to exist then as Tom, and Dick and Harry, having personal identity intact, with the separateness of personality, it can only be as space-occupying bodies. The question arises, what is this substance-occupying space which contains the personality and consciousness of Tom, and Dick, and Harry. Is it substance having weight, ordinary gravitative matter; is it the ether, or is it a middle soul substance, neither ether, nor gravitative matter? Most everyone believes that Tom, and Dick and Harry and all the rest of us do continue to live after the death of the body. It is the central idea of all the great religious beliefs. Out of these cogitations arose the desire to test by experiment if anything left the body after death that could be detected by a balance, and our experiments appear to prove *that there is a substance which goes from the body at death not accounted for by known channels of loss.* I wish to note further that if this substance lost at death is really

the soul substance and if it is in dimensions a counterpart of the physical body then its density is very much lighter than the atmosphere surrounding the earth, which would be rather a significant fact. Now, Dr. Hyslop, it may be that other investigators—if the matter is ever taken up—will prove that I have discovered a mare's nest. If they do, that will not prove, by any means, that man is mortal, for the soul substance may not be gravitative matter and yet be a substance.

I am well aware that these few experiments do not prove the matter any more than a few swallows make a summer, but yet the results should at least provoke further experiments. Now that the cat is out of the bag, by the least desirable method—newspaper publication—after being securely kept in for five or six years, if you care to publish this letter, I have no objection to your doing so. I dislike the sensational publication of the facts, but have not been able to prevent it, and perhaps the publication of this letter would do much to remove the misconceptions that have arisen, as it is the only written statement I have made concerning the matter since I last wrote to Dr. Hodgson five years ago.

Sincerely yours,

D. MacDOUGALL.

The following letters represent the correspondence between Dr. MacDougall and Dr. Richard Hodgson on the same subject. We have omitted such parts of the correspondence as was purely personal and irrelevant to the theoretical and experimental problem at hand.

November 10th, 1901.

Richard Hodgson, M. D.:

Dear Doctor:—While travelling to Europe on board the Cestrian of the Leyland Line this summer, a discussion arose one evening among a group of passengers coneerning the question of immortality, materialism or spiritualism.

At the end of the conversation I related an experiment which I had made which I thought of great importance in its bearing upon the subject. Dr. Herbert L. Burrel, of Boston, was one of the group and after I had related the experiment, he advised me to inform you of it. I had thought of you as one who might be interested, and the Doctor's recommendation determined me to write to you after I had returned.

In the first place I want to state the steps of reasoning that forced me on to making the experiment.

First. If personal continuity after the event of death is a fact, if the psychic functions continue to exist as a separate individu-

ality after the death of brain and body, then it must exist as a substantial material entity, for:—

Second. It is unthinkable that personality and consciousness can be attributes of that which does not occupy space and is absolutely imponderable—nothing. It is impossible to represent in thought, that which is neither space-occupying nor ponderable (in the sense of having weight) as having personality or consciousness, or any other quality, for that would be thinking of nothing as being something, which is a manifest contradiction. Since therefore, it is necessary to the continuance of personality and consciousness after death, that they must have some sort of a material basis, the question arose in my mind—Why not weigh on accurate scales a man at the very moment of death? Perhaps this material basis may be ponderable to sensitive scales even now at my command, perhaps it is so delicate that it may escape me, but nevertheless the experiment has never been done before. To settle the question it must be done.

On the 10th day of last April, my opportunity came. On a Fairbanks Standard platform scales, I had previously arranged a frame work of wood, very light; on top of this I placed a cot bed with clothing in such a manner that the beam was not interfered with in any way.

At 5:30 P. M. the patient, a man dying in consumption, was placed on the bed. He lived until 9:10 P. M. During those three hours and forty minutes he lost weight at the rate of an ounce in one hour, the sixtieth part of an ounce in one minute, so that every ten or fifteen minutes I was compelled to shift the sliding weight back upon the beam in order to keep the beam end up against the upper limiting bar, which I wished to do for the sake of making the test of sudden loss all the more marked and decisive, if such loss should come. This loss of weight, one ounce each hour or one sixtieth of an ounce each minute, was due to evaporation of moisture from the nasopharyngeal and bronchopulmonary and buccal mucous membrane accompanying respiration, and also to the evaporation of moisture from cutaneous perspiration.

At 9:08 P. M. my patient being near death, for the last time I sent back the shifting weight on the beam so that for the last ten minutes the beam end was in continuous contact with the upper limiting bar. Suddenly at 9:10 P. M. the patient expired and exactly simultaneously with the last movement of the respiratory muscles and coincident with the last movement of the facial muscles the beam end dropped to the lower limiting bar and remained there without rebound as though a weight had been lifted off the bed. Later it took the combined weight of two silver dollars to lift the beam back to actual balance. On weigh-

ing these they were found together to weigh three-fourths of an ounce.

This sudden loss of weight could not be accounted for by evaporation of cutaneous or respiratory moisture, that had already been determined to be at the rate of a sixtieth of an ounce in one minute, whereas this loss was at the rate of three-fourths of an ounce momentarily.

The bowels did not move. If they had moved the weight would have remained upon the bed excepting for a slow loss by evaporation of moisture depending of course upon the fluidity of the faeces.

The bladder moved slightly about one or two teaspoonfuls of urine escaping exactly at death. This remained upon the bed, and could only have influenced the result by slow gradual evaporation, and could in no way have accounted for the sudden loss.

There remained but one channel of loss to explore, the expiration of all but the residual air in the lung.

Getting upon the bed myself, my colleague, Dr. Sproull, put the beam at actual balance; I then forcibly inspired and forcibly expired all the air possible for several times, but this had no influence upon the beam.

Changing places with Dr. Sproull I watched the beam myself while he forcibly inhaled and exhaled all the air possible; the result was the same—no effect whatever upon the beam.

Here then is a loss of weight—three-fourths of an ounce occuring simultaneously with death not accounted for by known channels of loss. What is the meaning of it? Have I really weighed the soul substance?—the thing that carries with it in its flight, personality, individuality, consciousness.

I was looking up an Encyclopaedic Dictionary tonight on the subject of Materialism and I saw where Rudolph Wagner at a Congress of Psychology in 1854 had proposed a discussion of "soul substance" but not one of the five hundred voices present was raised in defence of a spiritual philosophy. Have I discovered Wagner's "soul substance" with my weighing machine? I think so, and I mean to verify and re-verify and re-re-verify, if I live long enough.

I would like you to be present at some one of the tests, and if disproof comes I shall be as ready to admit it as verification.

I feel sure that from you I shall have an impartial judgment, and I hope you will consent to be present at some one of the tests that must surely come this winter.

Very sincerely yours,

D. MacDOUGALL.

P. S.—Since writing the above my second experiment has been done. The following are the details:

The patient, a man moribund from consumption, was placed upon the bed of the weighing machine at 12:10 A .M. He was a larger man than my first case. He slowly lost weight at the rate of three-fourths of an ounce per hour until 4:10 A. M., when he apparently ceased breathing. For fifteen minutes after there was twitching of the eyelids and twitching of the lips only, during which time there was no loss of weight, the beam remaining constantly against the upper bar, then in a few moments after the last twitching the beam began to sink slowly until in fifteen minutes more it had touched and remained at the lower bar. A weight of one-half ounce moved it back again to the upper. At this point Dr. Sproull, my colleague, auscultated the heart and finding it stopped, the one-half ounce having been previously lifted off and the beam end at the lower bar, I tried again when it took one ounce and a half and fifty grains to lift it back to the upper bar. Inside of three minutes with all channels of loss closed a loss of one ounce and fifty grains took place. In the whole eighteen minutes, the total loss with all channels of loss closed that amount of loss took place, whereas in four hours with respiration and perspiration active the total loss was three ounces. No bowel movement took place. The bladder moved but the urine remained upon the bed, and could not have evaporated enough through the thick bed clothing to have influenced the result.

The beam at the end of the eighteen minutes immediately after the loss was determined was placed again with the end in slight contact with the upper bar and watched for forty-five minutes but no further loss took place.

My scales are sensitive to two-tenths of an ounce. If placed at balance, one-tenth of an ounce will lift the beam end close to the upper bar. A second one-tenth of an ounce will place it in contact with the upper bar; if then both are removed gently the beam will drop down nearly to the lower bar and then slowly oscillate until balance is reached again.

This patient was of a totally different temperament from the first; his death was very gradual so that we had great doubt, from the ordinary evidence to say just at what minute he died.

It is not however pure coincidence of loss that I am after; it is to determine if a loss of weight takes place at or near death which cannot be explained or accounted for by known channels of loss. This second test was as conclusive in support of my thesis as was the first. I beg of you to keep this private in the meantime. I am arranging to begin on animals.

Very sincerely yours,

D. MacDOUGALL.

The following is Dr. Hodgson's reply to the above letter:

Boston, Mass., November 29th, 1901.

Dear Doctor:—I was very much interested in your letter, begun apparently on November 10th but not finished or despatched till about November 25th. I congratulate you heartily on the experiments which you are making. I suppose it might be a little queer if I were to say that I hoped you would have enormous opportunities for your special experiment with the patients that come under your charge. I hope, however, that circumstances will enable you to take advantage of every opportunity that does arise. Your letter at once reminded me of a story in the Atlantic Monthly, which would doubtless interest you. It appeared in June, 1887, called "Crucial Experiment." Some of the characters appeared in a previous story in November, 1886, I think. The story is by J. P. Q———, who is the father of the former ———— of Boston. The professor in the story says that he hopes to "show that approximating the time when the soul leaves the body, there is an alteration in its weight which is capable of registration. I have caused the bed to be supported upon an exquisitely poised balance which will show any remission of the downward pressure." You would, I think, be interested in reading the two stories, which are not so much stories, perhaps, as means of expressing special views. In Quincy's article, however, the *corpus vile* does not die, so that the experiment is off, and no details are given. The possibility of the occurrence of some other form of disturbance at the moment of death is also suggested in the story. I should like indeed to see experiments which cover this point also. It would be very interesting, *e. g.*, if it should be found that there was some evidence of a special disturbance in the ether in the neighborhood of the dying body.

I am not sure that on philosophic grounds I entirely agree with the argument in your brief preamble. I should venture to urge that we are not justified in denying the existence of personality except as an attribute of a space-occupying material body, but a discussion on this point would be impossible as it would lead us into all the deepest realms of philosophy generally. There is another point where I think that you will probably agree with me. You may perhaps admit the possibility that there may be a physical correlate of consciousness, which physical correlate may nevertheless consist not of what is known as gross ponderable matter, but of the ether. It is thinkable that there should be some kind of ethereal body, and there is apparently a general consensus of opinion among physicists that the ether is imponderable. Any theory, however, is independent of your valuable experiments. I doubt if my assistance will be of any value at all to you in these, but I should of course be glad to do anything in my power.

I shall keep your communications private. As it occurs to me that it would be desirable to have as large a number of cases experimented with as possible, have you thought of obtaining help from other doctors or hospitals, *e. g.*, in the investigations or are you particularly anxious to make all the experiments yourself? I should be glad if you thought it advisable to try to enlist other workers in your behalf if possible, and have the results of your work handed over to you. I should like also, with your permission, to consult on your experiments with some of my medical friends here, on the understanding, of course, that it was a private matter and that it was your investigation. I should like to talk with ———, of Harvard Medical School, but of course I shall not do this, if you have any objection.

I agree with you very strongly, of course, as to the extreme importance of the investigation whatever results may be finally reached.

Yours sincerely,

R. HODGSON.

To this Dr. MacDougall replied as follows:

Dec. 5th, 1901.

Dear Doctor Hodgson:

I thank you for your kind letter of November 29th. Yea, verily, I do wish that the hope you express for enormous opportunities might be fulfilled, but I must bear myself with patience and wait for cases as the gods may send them. It is very singular that I should have carried out even to the point of completion, the experiment of J. P. ———'s fictitious professor. I have sometimes wondered if the idea of such an experiment had ever been entertained by others. But your information settles that point. I am rather glad to find that I have not been alone. Yes, it would be interesting to demonstrate if there is a disturbance in the ether at death, but I cannot imagine how such a demonstration might be made.

In regard to your second point, Doctor, I think we are more justified in assuming that that which is the container of the totality of the psychic functions, including consciousness and personality, and still persisting after the death of our bodies, is much more likely to be a material, organically linked with the body than the hypothetical, yet necessary ether-substance, which has never been demonstrated to be a necessary part of our living organism although necessary to our ideas of space and the action of energy, inter-planetary and inter-stellar.

My soul substance, which eludes me the moment I demonstrate it, is of course of such weight that it is totally different from the ether. Perhaps some genius will apply a spectroscope to it some day and demonstrate its composition. If we admitted

your proposition that consciousness and personality might exist in a body of ether, then we would still be fulfilling one of the principal parts of my thesis, because ether is a space occupying body. It really is unthinkable that consciousness and personality or individuality could exist in that which is not space-occupying, for that is practically attributing these qualities to space itself.

Going back to your theory of ether substance having consciousness and personality for its content, while I cannot conceive, yet it may be that there is a middle substance which is the soul substance, and which resembles the ether in being non-gravitative and therefore not weighable, but which resembles ordinary matter in being discontinuous or capable of existing in separate masses, which is a necessary condition for the existence of individual consciousness or separate consciousness having personal identity. However, I may be mistaken in my conception of this point of difference between matter and ether, *i. e.*, the continuity of the ether, and the discontinuous quality of matter. I realize that if my results are experimentally confirmed by others, then these results have a positive scientific bearing upon the doctrine of human immortality. If on the other hand I am proven to be in error in my experiments, the question remains as it was before—the absence of weight loss is no proof against human immortality.

And now, Doctor Hodgson, I want to thank you for your kindly interest. If you would like to meet me and my colleague, Dr. Sproull, I would be glad to drop in on you any day before Thursday next week at whatever time you may set, in order that he or I may answer any question you may have to put on the experiments, and in order that we might more fully explain the difficulties one has to contend with in doing the human experiment. Before Thursday of next week I shall have opportunity to go to Boston, after that I shall be held here for a time.

Sincerely yours,

D. MacDOUGALL.

P. S.—I forgot to say that if Mr. ——— would like to be present to question me or to make suggestion—provided you are able to meet me—I shall be glad to meet him.

Dr. Hodgson then replies in the following:

Boston, Mass., Dec. 9th, 1901.

Dear Doctor:

Thanks for yours of December 5th. The possibility of ascertaining any unusual disturbance in the ether in the neighborhood of a dying body would have to be tried by various forms of

experiment. They might indeed all fail even if there were such a disturbance, but the kind of experiment to begin with would be with instruments sensitive to slight electric changes, connected perhaps with a galvanic needle.

I suppose we must be content for the present to join issue as to the *a priori* probability as to the constitution of the physical analogue of consciousness, ether or gravitational matter. However, this will of course make no difference to the form of your actual experiment.

As regards your other point, it is a philosophic one. You say that it is unthinkable that consciousness could exist in that which is not space occupying. The real fact is that space is mental, and altho it may not be as Kant maintained, the form of all thought, it is the form of some thought; but here again, any view that we may hold on this point makes no difference to your actual experimental work.

I shall be glad to know of your later experiments and your publication.

Yours sincerely,

R. HODGSON.

It is apparent from the next letter of Dr. MacDougall that Dr. Hodgson had written a letter on the 3rd of January, 1902, but this is not included in those sent to me.

January 6th, 1902.

Dear Doctor Hodgson:

Yours of 3rd inst. received. I have no objection to your communicating with Mr. ———, and relating the matter to him, for I feel sure that at your request, he will preserve the privacy of the matter.

I would have no objection to your relating it to Dr. ——— at this time, but for the fact that I wish a third test before broaching the matter to positioned and entrenched scientific authority. I have had two rebuffs already from such a quarter.

I had hoped to communicate the result of the third experiment to you before this time, but a foolish misunderstanding barred me from what would have been an excellent test case. The misunderstanding has been cleared away and I am now free to go on with my observations whenever the opportunity presents.

I shall be interested to know what Dr. ——— thinks of the discovery. It is odd that his thought and mine should have coincided so remarkably. The idea struck me sometime in the winter of '96-97, and I am sure I never even read a copy of the Atlantic Monthly which is an admission I probably should be ashamed of.

The coincidence of thought but shows that after all there is

nothing more likely to happen than particular aspects of the environment—the objective forcing themselves upon the consciousness of the mind—the subjective.

Just as soon as the third experiment is recorded I will mail you the facts of the case. With many thanks for your kind interest,

Sincerely yours,

D. MacDOUGALL.

The present letter is a continuation of an account of experiments and is not especially a reply to any particular letter:

May 22nd, 1902.

Dear Doctor Hodgson:

Since I wrote you last I have had four more experiments on human subjects.

In the first of these four, there was a loss of half an ounce coincident with death, and an additional loss of an extra ounce a few minutes later, but in the interval there was a jarring of the scales and a movement of the beam that might have caused the sliding weight to shift acidentally on the beam. This jarring was caused in examining the heart with a stethoscope to determine whether or not the heart had ceased to beat.

In the second of the four, the patient dying of diabetic coma, unfortunately our scales were not finely balanced, and although there is a descent of the beam requiring about three-eighths to half an ounce to bring it to the point preceding death, yet I consider this test negative.

The third of the four cases shows a distinct drop in the beam registering about three-eighths of an ounce, which could not be accounted for; this occurred exactly simultaneously with death, but peculiarly, on bringing the beam up again with weights and removing them again, the beam did not sink back to stay back for quite a period—about ten or fifteen minutes. It was however impossible to account for the three-eighths of an ounce drop; it was sudden and distinct, hitting the lower bar with a noise as great as in the very first cases. Our scales in this case were very sensitively balanced.

The fourth case of this series was negative. Unfortunately owing to complications which we could not prevent the patient was but a few minutes on the bed before he died, and whether I had the beam accurately balanced before death or not I cannot be sure of. I am inclined to believe that he passed away while I was adjusting the beam. At any rate there was no loss of weight.

I have to add that the same experiments have been carried out on twelve dogs surrounded by every precaution for accuracy, and that the results have been uniformly negative—no loss of weight at death. A loss of weight takes place about twenty or thirty minutes after death, which is due to evaporation of the urine invariably passed, and which loss is duplicated by evaporation from the same amount of water on the scales, every other condition being the same, except the presence of the dog's body.

I feel that there is justification for others to go to the trouble of making these tests, and if you feel as well disposed to enlist others with opportunities for doing them as formally, I shall be glad to aid in any way from my experience.

An apparatus of mine is now in Boston, and I am willing to place it at the disposal of any one who has the opportunity and the desire to make the tests.

My chief reason for holding back on this before was the fear that after all I had discovered a mare's nest, and that I might put others to trouble for nothing.

It may be now that other experimenters will discover it to be a mare's nest; but at any rate we have sufficient grounds to warrant putting others to the trouble of proving the matter.

I forgot to mention that the dogs experimented on weighed from twenty to sixty-five pounds, and that the scales with total weight on them were sensitive to the sixteenth of an ounce, or thirty grains, yet no loss was demonstrable.

If it is definitely proven that there is a distinct loss of weight in the human being not accounted for by known channels of loss, then we have here a physiological difference between the human and the canine at least (and probably between the human and all other forms of life) hitherto unsuspected.

You are most kind to offer to try eo enlist others in the experimental work, and to relate the experiment to Dr. ———, but I would like to make the third experiment before you did that, after it I shall welcome such aid. I want to first publish the discovery as a fact in the physiology of death, stripped, as a good friend of mine has said, of its "psychical significance," because to insist upon the latter might raise prejudice in the minds of many of our present day scientific men, and prevent repetition of the experiment by others.

After the fact has been acknowledged and proven, it will be time enough to insist upon its meaning.

Many thanks for your kind interest. I will surely inform you at once after the third test. Sincerely yours,

D. MacDOUGALL.

(This concluded the correspondence.)