In characteristic fashion, and in a manner typical of the great physician that he was, Professor J. A. Ryle wrote the following account of one of the leading symptoms of his fatal illness. Shortly before his death he gave the typescript to his son, Dr. J. C. Ryle, with a request that it should be printed in the *Guy's Hospital Reports*. It was also his hope that any relevant postscript should be added; this has been done by his son and will be found at the end of the article.

Professor Ryle's earlier paper on "Angor Animi, or the Sense of Dying", which he refers to and was published in the *Guy's Hospital Reports* in 1928, is reprinted here and follows the posthumous contribution. This earlier paper makes it clear that Ryle found angor animi more frequently in vaso-vagal attacks than in coronary disease. It was thought that readers might find it an advantage to have these two papers together.

THE SENSE OF DYING—A POSTSCRIPT

By JOHN A. RYLE

THE assignment of physiological interpretations to the subjective phenomena of disease has always seemed to me to deserve more attention than has been given to it. It is, after all, both practically and scientifically, more important to know what a symptom means in terms of altered function than to associate it arbitrarily with this or that pathology. Furthermore, every distinct symptom is capable of both quantitative and qualitative variations and may be indicative either of functional disorder or of organic change. Its clinical interpretation thus calls for thoughtful assessments.

In 1928 I published in the *Reports* a short paper entitled "Angor Animi, or the Sense of Dying"; it was based on a communication given before the Association of Physicians of Great Britain and Ireland earlier in that year. I referred subsequently to this strange symptom in various papers, several of them reproduced in my *Natural History of Disease* (1936, 1948), and it also received mention in my Croonian Lectures on the "Visceral Neuroses" (1939) and in my Maudsley Lecture on "Nosophobia" (1947). The more I learned of the symptom, by studies undertaken in a large series of private cases, the more satisfied I became that it should be very definitely discriminated from any form or usual manifestation of anxiety or fear, and that it should be accepted, as Clifford Allbutt insisted (1915), as an "organic sensation". That is to say its manifestations are somatic and, while they may evoke fear at the time and a dread of recurrence, they are in no true sense a part of the fear syndrome. Nor can they possibly be deemed imaginary.

The sense of dying, as has long been known, occurs in an uncertain proportion of cases of angina pectoris and occasionally in labyrinthine vertigo and anaphylactic shock. It is a leading symptom in the vaso-vagal attacks of Gowers as described in his *Borderland of Epilepsy* (1907). It has been experienced by medical observers of undisputed competence in their own persons after too large a hypodermic injection of adrenalin, or perhaps after an accidental intravenous injection. I suggested, on the basis of these associations and of certain manifestations, including the profound and abrupt alterations of pulse-rate and blood pressure (which may occur in any of the above named conditions),

and also because a few instances are on record of the symptom as an accompaniment of structural disease affecting this zone, that the sense of dying probably reflected some transitory disturbance involving the medulla oblongata, where the centres of life itself reside. But I was still at a loss for a more precise account of the sensation and unable to explain its independent appreciation, by so many witnesses, as a veritable " aura of mortality ", the more so since the process of dying must clearly have been outside their actual experience and since a similar aura is rarely, if ever, mentioned by those who have narrowly escaped death in a great variety of other circumstances.

It had never occurred to me that I should have an actual opportunity of observing the symptom in my own person until the autumn of 1942, when I developed angina pectoris—to which members of my family on the maternal side have been prone in three successive generations. My first manifestation, apart from some minor hyperpietic symptoms and substernal pain, was a sudden and intense attack of the sense of dying. I had just climbed the stairs to the refectory in the medical school at Guy's and sat down to lunch when it swept upon me. I remember thinking to myself, in the very words employed over the radio by a gallant fighter pilot as he fell to his death, " This is it ", and I could not doubt that I was about to die. The sensation then, as afterwards, passed within a few seconds. On several subsequent occasions I was almost as convinced that the end had come. Thereafter I must have experienced the symptom, in very varying degree, probably on two hundred or more occasions within a period of 5 or 6 years, and I have long since come to accept it philosophically and with a considerable measure of interest. It rarely alarms me now. Although the quality of the physical distress remains much the same its intensity has diminished. It occurred to me that a description and a further attempt at analysis might have interest for others. The somewhat fuller understanding which I now have should certainly help, on occasion, to bring a measure of reassurance to fellow sufferers ; there is also a simple expedient which may help to curtail the episodes ; and I have come, perhaps, a little nearer to a physiological interpretation.

The duration of the symptom in my case is never more than seconds. It has never endured so long as it often appears to do in cases of Gowers' syndrome. It may accompany exercise and

substernal pain or oppression or shortly follow them, but—although related to these events—it is far more frequently independent of them in time. Its occurrence—as I have again and again proved—is very definitely connected with the amount of antecedent physical or mental exertion in which I have indulged. If I overstep my limits of activity I am almost certain to have attacks. If I keep to the rules laid down for me by my physician and my wife, I am virtually free, but this it is not always easy to do in a busy life. The commonest occasion for an attack is while resting recumbent after doing too much and thereby inducing pain or depression; but it arrives most commonly of all after I have dropped, at these times, into a blissful sleep. I am then suddenly wrenched back into consciousness by a surging sensation behind the sternum which seems to fill the upper thorax and to spread into the neck and head and sometimes down the arms to the finger-tips. There is no pain at the time and, if there is any local discomfort *other than that described*, it is of a trivial kind. With this event comes the indescribable conviction, in the more pronounced attacks, that I am in fact " passing out ". It is entirely different from the sensations common to ordinary faintness or giddiness, both of which I have encountered on very rare occasions

the past. There is no instability or failure of consciousness. far as I am aware the episodes are not characterized by any onounced changes in pulse-rate or colour. Again and again, owever, just before falling asleep, I have been uncomfortably aware of those cardiac sensations and head fullness and throbbings which seem to be associated with phases of a hyperpiesis well above my more constant level of raised blood pressure. The full relaxation accompanying the desired sleep has then seemed to me to result in a rather abrupt fall in pressure—for these discomforts have by then disappeared—and so I have wondered whether this drop in pressure induced by the relaxation of sleep may be a factor in precipitating the attacks.

At quite an early stage I discovered that a few deep breaths seemed to cut short the sense of impending death, but it was not until I had been quite familiar with it for upwards of four and a half years that I discovered that my breathing sometimes appeared to be automatically arrested in the attacks and that the deep inspirations were a voluntary resumption of the act. Then my thoughts went back to John Hunter's vivid description of his first

and terribly painful attack of what must have been a coronary occlusion, in which his feelings were recorded as follows :

> " The pain still continued, and he found himself at times not breathing. Being afraid of death soon taking place if he did not breathe, he produced the voluntary act of breathing by working his lungs by the power of the will."

At no place in the accounts of his subsequent illnesses is there any mention of Hunter's experiencing the actual sense of dying. In the majority of cases of effort angina the symptom either does not occur or is not recorded, although its occurrence has been freely commented on by all historians of the disease. My own clinical experience suggests that it occurs in some 10 to 20 per cent of cases of angina pectoris.

Is it unreasonable to suggest that the heart which, at a time of muscular anoxia, announces its distress by pain and by a secondary arrest of bodily movements, may on occasion induce a reflex respiratory inhibition in addition ? May not the biological purpose of each and all of these components of the anginal syndrome—the pain, the cessation of movement, the arrest of breathing and the sense of dying—be a warning or protective one ? At least it would seem a reasonable hypothesis. It is to be noted that other painful crises of great intensity, but lacking the associated hazard of angina (e.g. renal and biliary colic, and labour pains), go unaccompanied by the sense of impending death. I have not encountered the symptom in hyperpiesia unaccompanied by coronary disease.

There are many questions awaiting an answer in respect of the symptomatology of coronary disease. Why does the pain vary so much from one case to another—from a mere sense of pressure to the extremest agony—and why should there be no more certain relationship between the degree of pain and the degree of danger ? Why do some patients have arm reference of the pain and others not ? Why do some experience the sense of dying and others not ? Why is pain in both arms and in the jaw common during or after a coronary thrombosis and rare in the uncomplicated angina of effort ? Is there a relationship between the branches of the coronary arterial system most involved, or the area of musculature incommoded, and the character of the symptoms ? Will it ever be possible for a keen observer to signify in his last seconds of life whether or not the sense of dying was present ? Only the most careful observations and records of symptomatology in life, of

cardiographic findings and of morbid anatomy will allow of the correlations which may help to decide some of these issues.

For what it is worth I add this postscript to my original observations. I suggest that the sense of dying is best considered as a medullary aura—comparable with the epileptic aura and with the visual aura of migraine ; that it probably depends upon vasomotor changes operating upon and through the medullary centres and that the transitory arrest of breathing may be an objective association of the subjective *angor animi* and results from an overstimulation of the respiratory centre by impulses arriving from the troubled heart itself. Surely nothing better could be devised for the protection of this vital organ in moments of hazard, and from recurrent occasions of hazard, than these sensori-motor phenomena—pain, often of great severity ; arrest of bodily movements ; a transient inhibition of breathing ; the sense of impending death ; and the dread engendered both by the aura and the pain.

Later

In July, 1949, I had a coronary thrombosis with prolonged initial pain of a severe kind, a drop in blood pressure during the next 2 or 3 days from 220 to 130 systolic, a week of pyrexia, and some slight and transitory symptoms of basal congestion. During the phase of falling pressure I experienced several recurrences of the old symptom, which had been quite absent in the initial attacks of pain. Thereafter it again became rare and occurred chiefly just after slipping into a pleasant sleep which had been preceded by the familiar discomforts of a rise in pressure, affecting both heart and head.

For the present my suggestions would remain that, at least in the case of patients with coronary disease, the sense of dying may be considered as a biological warning to avoid, as far as possible, those efforts and situations which try the heart and disturb the blood pressure. As an indication of imminent death, however, it is a false signal and so, in all the conditions in which it occurs, patients may be fully reassured and their distress of mind in some measure relieved.

POSTSCRIPT

Dr. J. C. Ryle writes, " I think that my father's hope was that after his death any relevant postscript should be added. The symptom of *angor animi* remained with him up till his third

coronary thrombosis about two weeks before his death; thereafter anginal pain was replaced by failure and he did not mention the symptom again. During this time he believed with good reason on three occasions that death was imminent, but though perfectly rational did not make any reference to *angor animi*."

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