The thoracic cage itself is formed by the more distal part of the spirals, and the areas of the right and left spirals, fusing together in the midline, form the sternum (Fig. 26).

**DISCUSSION**

The observation that a spiral pattern exists in the early vertebrate embryo, and that it persists throughout development, suggests a means by which DNA, the genetic material, may control the development and appearance of the animal. For example, if the exact shape and curve of the spiral pattern at the position of the future nose resembles the parents' original spiral pattern, it would explain the resemblance between the offspring's nose and that of the parents.

The persistence of a spiral pattern throughout development also offers an explanation for the maintenance of the relative sizes and proportions of the organs of the body to each others, since the pattern is maintained as growth continues.

Finally the observation of a spiral pattern may have evolutionary implications, since it offers an alternative to natural selection for the existence of a common vertebrate pattern, for if all vertebrates commence from a similar spiral they would have a common pattern. In addition, the early features of all vertebrate embryos would resemble each other.

The differences between species might in fact be due either to differences in the initial spiral or to different degrees of unwinding of the same spiral.

**REFERENCES**


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**The Doctor and Society**

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**SUMMARY**

The doctor, no less than any other scientist, is a member of society. His situation, however, is unique, inasmuch as in an age of technocracy he must remain human. Despite the pressure of his own discipline he should be an educated person in the general meaning of the word. The necessary attributes of this state are outlined and an ideal is formulated.


Good medicine cannot be practised in a social vacuum. As a discipline and a science, medicine has exerted a profound and multiform influence on social norms and human destiny. The paths of medicine, society and the patient form an interwoven meshwork at the intersections of which ethical issues arise. These are not probed or raised as often as they should be by the doctor.

In this discussion, based on diverse opinions, I will not confine myself to medical ethics alone, but will explore some of these problems in a broader sense. This is an age of super-specialization where C. P. Snow's original concept about the two cultures is in many respects passé. He warned of the divergence and increasing lack of communication between scientific doctrine on the one hand and the humanities on the other. Advances have been so rapid, in fact, that not only is this disparity apparent but within the ambit of science itself highly sophisticated splinter groups have arisen who live in mental isolation, cut off from the ideas of fellow scientists.

**THE MODERN DEMANDS**

Many demands and forces impinge upon today's physician; an informed public wields the baton of personal interests; geneticists and population experts are concerned about heredity and explosions and clergymen and politicians add their not inconsiderable weights to an already unstable seesaw. Thus for him, with progress in medicine, technical decisions become easier while moral and legal problems become increasingly significant and difficult. Beyond and to an extent because of these, is the call and the need for the doctor to be as much a skilled technician as a cultivated person in the general meaning of the word. There is still as much art as science in doctoring. The physician is after all dealing with a thinking, feeling, complex and frequently unpredictable individual and not an inanimate object. The physician who is himself a full member of
society and who exercises his mind in other directions in addition to medicine, speaks with more authority and can better understand the patient.

It is conceded that the era of a Da Vinci is past, that the tempo of living has accelerated and that even the bare essentials of everyday existence consume much of our time and energy. It does remain, however, intellectually beneficial to at least take a view of the growing horizons and maintain an appetite and interest for the phenomenal world outside our own mental microcosm. On the larger canvas it is to be noted that psycho-social evolution is painted as a broadening rim of light encroaching steadily on the frontiers of darkness. In short, the good doctor should be an educated person—an intellectual. Whenever one talks of intellectual qualities, one treads on dangerous ground and I am particularly reminded of Toynbee's appropriate remark:

"When, in a mental voyage, I found myself at the upper limit of the atmosphere accessible to the reason I did not hesitate, but let my imagination carry me on up into the stratosphere, on the wings of a myth."

I will attempt to delineate such imaginings, although my attempt to distil these is rather like trying to make love to a tiger. The subject fringes on the area between reflections and reflexes, because we are close to a solution but do not have a general theory. For this reason, I have decided to take refuge behind a form of didacticism which is a painting and not a mirror-image. I will nevertheless keep my feet firmly planted in the air—that is what heaven is for! In dealing with the qualities of the doctor in society, I am in fact diagnosing the social biology of expectation.

ESSENTIAL CHARACTERISTICS

The following characteristics seem to me essential attributes:

Communication

The ability to communicate ideas and emotions distinguishes man from his immediate evolutionary ancestors. In its most sophisticated form one achieves an esoteric communication with colleagues in the same field of interest and who have the same modus vivendi. Here ideation in sound or symbol promotes the contact and merging of highly integrated levels of consciousness. In general, however, communication is ideally a balanced combination of clear, sequential ideas expressed in the spoken or written word as well as in behaviour, physical contact and various forms of symbolism.

This broad approach is fundamental to a sound doctor-patient relationship. Frequently the sick are incapable of describing clearly their symptoms, or through fear withhold information. More often the medical man is inclined to forget that patients do not require a label to be given to their illness. They want to know to what degree they will recover, if at all, and they require assurance and reassurance. A growing number of people in the world today are interested in disease and its prevention and have gleaned some medical knowledge through the press and other media. Nevertheless it is remarkable that on discharge after several weeks in hospital the great majority of patients are quite oblivious of the nature of their illness, or of the purpose of the various diagnostic and therapeutic procedures carried out by their well-intentioned but uncommunicative doctors. They are unaware of the nature of and the necessity for the variety of coloured pills they carry home! Again, words alone may clarify and be coldly concise but a reassuring hand on the shoulder is frequently worth more than a handful of tranquillizers.

Knowledge is Required

In essence this is easy to acquire. A basic framework should be constructed upon which the constantly changing padding of new scientific thought can be moulded. Knowledge may be likened to a circle of light on a dark background. Initially, the circle is small and when one wanders around its little dark perimeter the things one does not know—that is the dark things along the dark border—do not seem extensive. As the circle grows, so does the perimeter of the known enlarge, and this generates humility—or should.

Of course, facts are needed, but these must be correlated and woven into a meaningful pattern of understanding. The process of accumulation and mental integration of facts requires positive action—no one concerned with learning can be a passive onlooker. In the area of research and in an era of advancement in the technologic field, Pasteur's remark that 'chance favours the prepared mind' remains pertinent.

A degree of selectivity has to be exercised here, however, because we find all too rapidly that even in a given field one is confronted with an unending universe of facts in number and diversity well beyond man's mental capacity. As Bertrand Russell points out: 'I have sought knowledge, I have wished to understand the hearts of men, I have tried to apprehend the Pythagorean power by which number holds sway above the flux. A little of this but not much I have achieved.'

Logical Argument

Next I place the ability to follow logical argument and to know when a thing is proved. This flows from knowledge but is additional to it. Facts and those nebulous entities of the consciousness, concepts, which are born of facts, must often be evaluated. Armed with logic, one attempts to trace the thread of truth through the tangled skeins of opinion and belief to arrive at a conclusion. While this is a subject unto itself, one can obtain clarity by following the injunction of Marcus Aurelius: 'Look to the point of a thing—whether it be a point of doctrine, of practice or of interpretation.'

Understanding

A cultured individual should be able to read a book and know what it says. Most of us read; many out of boredom or loneliness and their comments are as pointless: boring,
inspiring, too simple and so forth. Agreed, the great majority of lesser writers fit these epithets admirably and can offer no more. The good author has something definite to say; his inner thoughts and aspirations are poured forth into print; he holds a mirror before our eyes to reflect the tragedy, the comedy, the animalism of mankind. Such a view can only soften and restore balance to an otherwise mechanical and computerized approach at the interpersonal level.

Literature aside, however, those involved in any scientific discipline are constantly having to peruse journals to keep abreast of new developments. Even on this less colourful plane it is incumbent upon the reader to recognize and then understand what ideas the writer is conveying.

**Insight**

The quality of insight is all too frequently absent in a materialistic world. Mind has been compared to an iceberg — only a fraction juts out above the dark waters. This conscious part is aware of its origins, its existence and its surroundings. It is also aware of other consciousnesses and perceives that they in turn are aware of it. This feature alone would be sufficient to justify the crown of supremacy falling on the head of the naked ape. To a large extent insight is an emotional thing. It intensifies dramatic moments, lends colour to a grey world and renders otherwise improbable and impossible situations more humane.

In an analogous way insight makes experience profitable. Insight catalyses knowledge and experience so that wisdom results. Experience by itself is entirely repetitive and fruitless. Although considered a gift, this quality can be cultivated, especially under the influence of the arts. The use of colour, the delineation of form, patterns of sound and movement provide a whole spectrum of emotional experience which is enriching. A transposed version of Plato is illustrative:

'The arts constitute a moral law
They give a soul to the universe
Wings to the mind
Flight to the imagination
A charm to sadness
Gaiety and life to everything
They are the essence of order and lead
To all that is good, just and beautiful.'

Sprung from these concepts it becomes apparent that insight with its special relationship to the art forms, sharpens our spiritual sensitivity and may provide guidance in the jungle of facts, it creates a capacity for sympathy and helps to fulfil the wish 'to understand the hearts of men.'

Having thus eulogized, one might pause here a moment to note that only two qualities really merit admiration: kindly feeling (sympathy, empathy, deriving from insight) and veracity (deriving from knowledge, logic, ability to communicate). To cultivate them it is not necessary to appeal to supernatural powers, but only to have a general wish for happiness. It is not irrational to believe that the world would be a better place if these two virtues were more generally practised. In them is seen again the art and the science of medicine

**THE IDEAL**

I have omitted in this view of the educated man to mention specifically that a positive being in society requires hope, perseverance, dedication and other qualities, all of which I consider to be components of the formulation I have already outlined.

I come at my ending to my beginning. Like Bertrand Russell, the physician in society may well have two parallel yet inverse paths to tread: one is initially concrete (his science which gradually becomes more and more abstract as new horizons are reached); the other is abstract in the beginning (his essential humanity becomes gradually more and more concrete). Surmounting and bridging both is the final synthesis which still eludes us—as an ideal, like all ideals it should nevertheless be ardently pursued.

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