ORIGINAL COMMUNICATIONS.

HINTS ON AUSCULTATION, WITH A VIEW TO THE SIMPLIFICATION OF TERMS AND ARRANGEMENT.

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THE present century has been a period of remarkable progress, as respects the diagnosis of thoracic disease. A glance at standard works published less than thirty years since will exhibit striking evidence of the truth of this assertion.

It may be sufficient to instance the remarks of Dr. Mason Good, in the second edition of his work on the *Study of Medicine*,* published about the period when Dr. Forbes first called the attention of the profession in this country to the observations of Laennec. The chapter on Dropsy of the Chest, in Dr. Good's work, affords material of much interest, viewed in relation to the present mode of investigation. In reference to dropsy of the mediastinum, pleura, pericardium and lungs, Dr. Good observes: "These can never with any degree of certainty be distinguished from each other till after death"; and "those who are desirous of examining into the curious and often contradictory signs by which these several forms of pectoral dropsy have been attempted to be discriminated by various writers, may turn with advantage to Sir J. Maclean's work upon the subject". He adds (p. 407): "The only decisive symptom in this disease is the fluctuation of water in the chest, whenever it can be ascertained; for several of the other signs are often wanting, or, in a separate state, are to be found in other complaints of the chest as well as in dropsy, more particularly in asthma and empyema."

Every reader of this JOURNAL is familiar with the change effected in this department of inquiry since these remarks of Dr. Good were penned. It must, however, be acknowledged that the advantages which the new modes of investigation offer, have not always been realized; partly in consequence of a tendency to regard the phenomena observed by means of auscultation as necessarily intricate and complicated. Such an idea is surely founded on misapprehension. The soft silky sound, heard on listening to the chest of a healthy individual in the act of breathing, cannot be mistaken. Every practitioner must have had frequent occasion to observe this silky murmur superseded by bubbling sounds, when, in consequence of affections of a catarrhal character, the air in its entrance and its exit passes through the secretions with which the air passages are occupied: the sound being necessarily modified according as this secretion is confined to bronchi of considerable calibre, or diffused through the smaller tubes, or the aerating tissue of the lungs. When the smooth expansion of this tissue is prevented by causes extrinsic to the cells, and the air in expiration does not pass through secretion, the sound produced has not a bubbling character, and may be confined to the period of inspiration. In this way, varieties of crackling and crepitation sounds originate.

When, in consequence of thickening of the investing membranes, or the presence of any partial obstacle, the calibre of the bronchi is altered, vibratory sounds are induced, which may be grave or acute, according to the diameter of the passages affected.

The simple view thus presented sufficiently represents the principal circumstances, which require to be considered in the practical application of auscultation to those diseases of the chest, in which difficulties are most frequently experienced and errors most readily committed.

It must be acknowledged that familiarity with the practice of auscultation requires for its attainment considerable devotion of time and labour; but it will scarcely be disputed that, in addition to the difficulties inherent in the subject, others have arisen: 1st. From attempted refinements, not

authorized by existing phenomena; 2nd. From the use of terms, either inaccurate, or not sufficiently distinctive. The first of these mistakes tends to render the art of auscultation unattainable: the second introduces confusion, which is often worse than ordinary error, because it is a form of error difficult to correct. I do not expect in the present communication altogether to avoid these defects; but it will be my aim to describe only sounds which can be readily recognised, and to select such terms as shall express as marked a difference as possible between sounds differing in their character and practical significance. Whilst avoiding any unnecessary alteration of terms which have been sanctioned by general usage, I shall not scruple to displace those which are obviously inaccurate or calculated to induce practical error.

In attempting to form systematic classifications of auscultatory phenomena, confusion has often arisen from the circumstance, that some sounds have been designated according to the impression made on the ear, and others in subservency to some theoretical idea regarding their mode of origin. Thus, for example, the crepitant rhonchus, although from its name implying a sound dry in character, is yet placed by some authors amongst moist rhonchi, from the supposition of its being due to the presence of secretion. If it be considered convenient and expedient to make an arrangement founded on the nature of the impression made on the ear, whether of dryness or of moisture, the crepitant rhonchus should certainly be placed in the first of these divisions: and my own view of its cause would induce me on theoretical grounds to consider this its appropriate place.

The following arrangement may be considered to afford a simple and comprehensive exhibition of the most remarkable sounds, according to the principle of classification which has just been noticed.

TABLE I.—*Râles or Abnormal Sounds produced within the Lungs, arising from Morbid Secretion.*

		Heard in	
		Inspiration.	Expiration.
I. Dry.	1. Sibillant	—	—
	2. Sonorous	—	—
	3. Crackling (or dry click)	—	—
	4. Crepitant	—	—
	a. Primary (or fine crepitant)	—	—
	b. Secondary	—	—
II. Humid.	1. Bubbling (or subcrepitant, or moist crepitant, or muco-crepitant)	—	—
	2. Mucous	—	—
	3. Crackling (humid click)	—	—
	4. Cavernous (or gurgling)	—	—

This plan is a slight modification of that suggested by Dr. Walshe, as proposed by my colleague Dr. Cotton; but, however comprehensive and simple in appearance, it appears to me on practical grounds liable to objection.

It is difficult by any verbal representation to convey to one man a correct idea of the impressions made on the senses of another; and in adapting terms to describe impressions on the ear, it is undesirable to introduce those which are expressive of pathological conditions. The remarks of Skoda, that crackling is a dry sound, and indicates the presence of fluid, probably of a tenacious character, in some of the bronchial tubes, or in a cavity, may serve to illustrate the contradictory character of the language, to which designations involving speculative opinions are apt to lead. In the attempt now made to simplify the subject, I shall not include all the auscultatory sounds, but chiefly those of practical importance, which are most easily confounded, in consequence either of some supposed similarity in their character, or of the ambiguous terms by which they have been designated. Percussion sounds, modifications of sound derived from the voice, cardiac, venous and arterial murmurs are omitted; since they are for the most part easily

distinguished, and the terms by which they are designated are sufficiently expressive.

It is undesirable to give similarity of name and juxtaposition in arrangement, to sounds characteristic respectively, some of inflamed lungs, others of consumption, and I would venture to propose, as simple, distinct, and suited for clinical purposes, the following division into bubbles, clicking, crepitation, crackling, and vibration.

The first column exhibits the arrangement which I propose; the second, the corresponding terms in most frequent use; the third contains brief descriptions of the distinctive characteristics of each sound; the fourth notes the occurrence of the sound, whether chiefly in inspiration or expiration, or in both; the fifth shows the most common seat of each sound; and the sixth, the principal disease in which each sound is manifested.

TABLE II.

	Sounds.	Synonyms.	Character of sound.	Relation to		Common seat.	Accompanying disease.
				Inspiration.	Expiration.		
I.	Bubbling. a. Bubbling rhonchus b. Small bubbling rhonchus c. Gurgling	Mucous rhonchus. Subcrepitant rhonchus. Cavernous rhonchus.	Unequal irregular bubbles altered by cough. Few irregular bubbles.	— — — — — — — — —	— — — — — —	Middle of both lungs. Base of both lungs. Summits.	Bronchitis. Capillary bronchitis. Excavation.
II.	Clicking.	Humid crepitation or humid crackling rhonchus.	2, 3, or 4 clicks.	— — — —	—	Summits.	Softening tubercle.
III.	Crackling.	Dry crepitation or dry crackling rhonchus.	2, 3, or 4 dry sharp sounds.	— — — —		Summits.	Unsoftened tubercle.
IV.	Crepitation.	Crepitant rhonchus.	Numerous minute, similar rapid puffs, like salt on fire, or rubbing lock of hair between fingers.	—		Base of one lung.	Pneumonia.
V.	Vibration. a. Sonorous rhonchus b. Sibilant rhonchus				— — — — —	General General }	Bronchial asthma, etc.

I. BUBBLING SOUNDS are produced by air passing through secretion in the bronchial tubes, as peculiarly occurs in bronchitis; in those of moderate calibre constituting what has been usually designated mucous rhonchus. The smaller bubbling rhonchus produced in the capillary bronchi, commonly known as subcrepitant, should rather be termed sub-mucous, if, from respect to long usage, the somewhat questionable term "mucous" be retained. To these bubbling sounds the term rhonchus is appropriate; but I do not dignify with this title sounds probably produced externally to the cells, such as crackle and true crepitation, which are not proved to have any relation to the passage of air through secretion or vibrating tubes.

II. CLICKING consists of a series of sounds, few in number, exactly corresponding to the term, audible in some degree during expiration as well as inspiration, and probably never existing except when softened tubercle is present.

III. CRACKLING—a term which itself defines the sound—consists of a few, (not more than three or four,) crackles limited to the period of inspiration, seeming to arise at a distance from the ear, probably produced externally to the cells, and characteristic of the first stage of phthisis, although not invariably present under such circumstances.

IV. CREPITATION consists of more numerous and finer sounds than crackling. It is also confined to the period of inspiration, and is probably due to viscid secretion in the cell-walls, occasioning difficulty in their expansion. It is peculiar to pneumonia.

V. VIBRATIONS. Of sonorous, grave or cooing, and sibilant, shrill or whistling rhonchus; sounds resulting mainly from vibration, and indicating flattening or narrowing of tubes, such as is common in chronic bronchitis, it may be sufficient to remark that, when occurring interruptedly, these rhonchi may be occasioned by vibrations of air produced by pellets of mucus, as is sometimes observed in pertussis; but that in proportion to the continuousness of these sounds, there is reason to suspect turgescence or thickening of the membrane, or effusion in the submucous tissue.

A few incidental remarks may here be expedient, in order to explain a little more particularly the modifications which are suggested in this communication.

The term subcrepitant rhonchus has been so long and extensively employed, that the attempt to displace it may seem a bold and doubtful experiment; but I scarcely know a medical expression which has tended to more danger in practice. The term conveys to the mind the idea of a sound analogous to that usually designated crepitant rhonchus (but which I propose to call crepitation); and has in consequence led to injurious depletion. If asked to specify the greatest abuse of auscultation with which I am conversant, I should instance the leeching and antimonializing of children, in certain pectoral affections, of which the subcrepitant rhonchus is a prominent symptom. Under the cover of a pedantic numerism, the cure of pneumonia without depletion has, on the continent especially, been assumed to be common, because this so-called subcrepitant rhonchus, although really differing in character of sound, as well as in cause, has been mistaken for the rhonchus characteristic of pneumonia. A reference to the table (No. 2) will show the marked difference between these sounds.

As respects diagnosis and treatment I cannot but think that great importance may be advantageously attached to the co-existence of certain sounds with expiration as well as inspiration, with certain qualifications, particularly in reference to vibratory rhonchi; the presence of a morbid sound during expiration affording evidence of the presence of secretion within the cells or tubes. This view is supported by the concurrence of clicking, from softened tubercle, with both respiratory actions, as contrasted with the inspiratory crackle of the first stage of phthisis. The same peculiarity distinguishes the small bubbling (submucous rhonchus) from true crepitation (crepitant rhonchus), which resembles the noise produced by rubbing a lock of hair between the fingers, and conveys to the mind an idea (probably in harmony with the fact) of the abrupt forcing open of cells rendered less yielding by glutinous deposition in their walls.

If the cause commonly assigned for "crepitant rhonchus"—namely, air passing through secretion—were correct, the air in repassing should produce a rhonchus during expiration also. The presence of viscid secretion within the pulmonary cells in pneumonia may be acknowledged, without conceding that this secretion is concerned in the production of crepitation; indeed, its tenacity may be a reason why bubbles are not produced, the calibre of the capillary tubes to a certain extent remaining free. When, in the resolution of pneumonia, the secretion becomes less viscid, and occasionally more copious, the rhonchus changes in character, and the sound which has been designated the *redux crepitant rhonchus*, having more of a bubbling character, and more or less audible during expiration, is produced. The sound sometimes termed continuous subcrepitant rhonchus, existing only during inspiration, and accompanying pulmonary congestion such as attends some forms of fever, I should regard as a subcrepitation, not a rhonchus.

As respects the treatment of inflammatory affections of the lungs; in proportion as sounds are confined to inspiration, they afford reason for depletion; in proportion as the rhonchi become bubbling, they indicate secretion, and suggest a discontinuance of antiphlogistic treatment.

The advantage of introducing terms so diverse as is suggested in the present plan is obvious. If we speak of crackle, the first stage of phthisis is indicated; if of clicking, the stage of softening; if of crepitation, pneumonia is known to be present; if of bubbling or small bubbling rhonchus, secretion more or less copious is known to be present in the different orders of bronchial tubes.

Some authors, otherwise instructive, have complicated the subject of auscultation by looseness of expression, as well as by over refinement. Dr. Stokes, for example, in a work generally admirable for breadth of view and clearness of style, has sanctioned the use of that ambiguous term "*mucocrepitant rhonchus*"; regarding which it has been well observed, that if twelve physicians were asked the meaning, it is doubtful whether two would agree.

It is a sufficient proof of the vague manner in which auscultatory terms are employed, that when an author uses the word crepitation, we are often at a loss to determine whether he intends dry crepitation (crackle), moist crepitation (clicking), or subcrepitant rhonchus (small bubbling rhonchus), or the true crepitation (crepitant rhonchus) of pneumonia.

The distinctions attempted in this communication may be open to incidental objections; and doubtless the phenomena observed in practice are not likely exactly to correspond with systematic arrangements; but the beginner requires broad distinctions, and his own studious care will familiarise him with the requisite modifications. It should be remembered that the loudest sounds are not the most important. On the contrary, catarrhal affections of the larger tubes may seem to the novice more alarming than the fine crepitation of pneumonia, or the delicate crackle or clicking of phthisis. Skoda has expressed an opinion that dry crepitation (crackle), and moist crepitation (clicking), are bronchial sounds, and have no necessary relation to consumption. I cannot concur in this conclusion, although aware that varieties of subcrepitation may be mistaken for them, if we overlook the modifications produced in bronchial sounds by deep inspiration or cough. If a doubtful sound is removed by cough, or superseded by vibration sounds on deep inspiration, we may, with little exception, conclude that it is not crackle or clicking.

Let me venture to urge the desirableness of avoiding the mongrel combinations of different languages, too common in medical descriptions, and of adhering, whenever practicable, to our own mother tongue. The avoidance, as far as possible, of foreign expressions, is important to simplicity, to accuracy, and one is almost tempted to add, to patriotism. And although, in this particular department of physical science, the use of French words has a special palliation, it is yet better to sacrifice this consideration; since, whenever our own language is deficient in descriptive terms, Greek words, or Latin words of Greek derivation, have the superiority in expressiveness, and in harmony with our own. Of this

truth, the word "*terminus*", for the extremity of a railway line, may furnish an example. For the purpose of designating certain unnatural sounds not easily expressed by any of our English words, the word "*rhonchus*" is perhaps the most appropriate, from its compass and expressiveness of meaning; but there are advantages in restricting its application to sounds produced by air permeating tubes or cells, modified by the condition of those tubes or cells, or of the fluid through which it passes. The original word "*rhonchus*" was occasionally employed to represent the sound of air disturbed in its course; but not unfrequently to signify the murmur of waves against particular obstacles. It was especially applied to the noise of deep waters striking against precipitous rocks. Those readers of this Journal who retain the youthful freshness of their classical literature, may recollect other instances. I will only quote an example of the use of the kindred verb in the beautiful description which Homer gives of the waves breaking against the rocks of Scylla:—

*Ἐνθεν μὲν γὰρ πέτραι ἐπηρέφες, πρὸς δ' αὐτὰς
Κῦμα μέγα ῥοχθεὶ κυανώτιδος Ἀμφιτρίτης.**

It may be objected that the introduction of new terms will tend to increase the perplexity we desire to avoid; but this difficulty may be to a great extent obviated, if, in using words not generally adopted, the best understood of synonymous words be placed in parentheses; for example, crepitation (*crepitant rhonchus*), bubbling rhonchus (*mucous rhonchus*).

In conclusion, it should be observed that the most accurate description of sounds, and the greatest aptitude in their detection, must never be considered sufficient without a careful investigation of collateral symptoms. A habit of expecting conclusive evidence from unassisted auscultatory signs has frequently entailed disappointment, and induced unreasonable disparagement of this branch of the medical art. A change of sound doubtless proves a change of condition; but as several pathological conditions may sometimes induce a similar sound, other indications must be sought, in order to determine which of these conditions is present. Notwithstanding the definiteness of information regarding local affections, which auscultation may often supply, no prudent practitioner would determine his treatment without taking into account such circumstances as the degree of rapidity or labour in respiration, the character of the expectoration, and the amount of constitutional disturbance. The inadequacy of any single indication as a guide applies, however, still more to symptoms arising from sympathies than to those depending on acoustic principles. There is in some minds a "*barrenness of faith*" leading them to distrust the details which conduce to general truth; and it is doubtless easy to be unnecessarily minute in distinctions of sound, but the misuse of auscultation arises less frequently from undue refinement than from a want of correct appreciation of the distinctions most practically important. Disproportion is the great cause of erroneous opinion, no less than of monstrous forms. It is better to begin with doubts and end with certainty, than to begin with confidence and end with distrust; and I cannot question that whilst auscultation is studied with the caution and ingenuousness of true philosophy, it will never lose ground in the estimation of the profession.

3, Bedford Square, April 12th, 1853.

ON THE OCCURRENCE OF HERNIA BRONCHALIS DURING LABOUR.

By HUGH ROBERT RUMP, Esq.

THE following observations on hernia bronchialis, as it occurs during labour, I have been induced to offer, from the silence of all obstetric authors on the subject; at least as far as I am enabled to judge. Burns is the only writer who alludes distinctly to the neck as a region connected with the process of parturition in a pathological sense, and then only as regards bronchocele. In the twenty-first

* *Odyssey*, xii, 59-60.