wooded ravines, which impart a picturesque beauty to the scene. The highest point in the district is nearly 1300 feet above the sea-level; and here, in a hamlet close by, I have found cases of goitre. The villages are met with in three situations: (1) on the mountainous moorland; (2) in the wooded valleys; and (3) on the fertile plain—in all, goitre is to be found. The district may be said, geologically, to stand on the middle and upper oolitic formations. The plain consists of alluvium, upon Kimmeridge clay, in which iron pyrites is found. The hills are mostly tabular, and consist of Kellaways rock, Oxford clay, and calc grit. In one valley alone, at the extreme western boundary of my district, is the lias formation met with. The remaining geological details (for which I am indebted to Mr. C. Fox Strangways, F.G.S., of Her Majesty's Geological Survey) are given shortly in the following statement (from *Memoirs of the Geological Survey*, 96, S.E.).

The following are the geological formations which occur in the district:—*Recent and Post Glacial*: Alluvium; warp and lacustrine clay; sand and gravel.—*Glacial*: Boulder clay and gravel.—*Upper Oolites*: Kimmeridge clay.—*Middle Oolite*: Upper calcareous grit; coral rag and upper limestone; middle calcareous grit; lower limestone; passage beds; lower calcareous grit; Oxford clay; Kellaway's rock.—*Lower Oolites*.—*Lias*.

Those geologists who have studied the distribution of goitre have remarked its entire absence on the oolitic formations. Mr. Lebour (*On the Geological Distribution of Endemic Goitre in England*, by G. A. Lebour, M.A., F.G.S., Professor of Geology, University of Durham College of Science, Newcastle-on-Tyne) has, among other interesting details, drawn attention to the absence of goitre on the oolites. It is said that the Yorkshire oolites differ in composition from, although they are geologically the same as, the oolites of the South of England. Dr. St. Lager, in his work already referred to, speaks also of the absence of goitre on the oolitic formations in France. Goitre is said to be of rare occurrence on the lias; but in the valley I have just spoken of it is quite common. In justice to Dr. St. Lager's theory, I may say that iron is found in many parts of the district; and at one place there are two iron and two sulphur springs rising together within a few yards of each other. These springs are of great depth, and do not represent the drinking-water of the locality, but are used by invalids for medicinal purposes.

[To be continued.]

NEW CONVERTIBLE STETHOSCOPE.

By JOHN WARD COUSINS, M.D.Lond., F.R.C.S.,

Surgeon to the Royal Portsmouth Hospital, and late Resident Surgeon to the City of London Hospital for the Diseases of the Chest.

THE new stethoscope, which I beg to introduce to the notice of the profession, is a very simple contrivance, possessing the advantage of the double and single instruments in combination. The single stethoscope is now made in many forms, and with a variety of materials; still there exists a general preference in favour of the old-fashioned wooden instrument. At the present time, it is almost universally used by practitioners; and, no doubt, it serves, in a vast majority of cases, every purpose for correct diagnosis. But the practical question arises: Why is the single instrument so generally employed, instead of the double stethoscope? The preference, however, appears to me capable of very ready explanation. The double stethoscope, in the form in which it has hitherto been presented to the profession, since its introduction by the late Dr. Leared, is a somewhat costly instrument, and certainly less portable than the ordinary wooden tube. Few medical men are inclined to carry two forms of the same instrument, especially when one has been used habitually and successfully for many years. Moreover, the introduction of the ear plugs of the binaural stethoscope into the auditory canal sometimes causes uneasiness and discomfort, and this is frequently observed when they are supported in position by an elastic band. The external meatus is of very variable capacity in different individuals, and this important fact is often overlooked. It is essential that the plugs be perfectly adapted to the size of the canal: for, when they are too large, they cannot be retained; and, when too small, they occasion unpleasant sensations and friction-sounds in the ears. These inconveniences, however, are only temporary, and can be readily overcome by frequent practice with a well selected instrument.

The double stethoscope presents many special advantages in the physical examination of the chest. Two ears are certainly better than one for discriminating sounds, just as two eyes are better than one for purposes of vision. It is often important, for the sake of accurate diagnosis, to hear sounds emanating from a region of the chest with two ears simultaneously; and the value of the binaural stethoscope is very

evident in distinguishing obscure and feeble sounds, and also in defining the precise seat of their greatest intensity. The double stethoscope is certainly the best instrument for the student. It is a good plan to commence the study of auscultation with both ears, for this renders a practical acquaintance with the details more easy. The auditory power is very variable among different individuals, especially an acuteness of hearing for recognising low and feeble sounds; and experience proves that this power of ready discrimination is far more effectively cultivated with two ears than with one. By the same means, too, the faculty can always be improved and sharpened; and, with those who have long confined themselves to the use of the single instrument, and who have hitherto had no confidence in the binaural, it will be a great help to conduct an examination by the aid of both instruments alternately. A comparison between the auditory impressions can be thus readily obtained, the old prejudice will soon be dissipated, and the great advantage of using both ears fully recognised. I have often heard my friends remark, that "they do not like the double stethoscope"; but this dislike has been generally associated with no real effort to learn its great practical value. It is admitted by all accomplished auscultators to possess many advantages; and I am bold enough to express the opinion that it will, before long, take the place now occupied by the old-fashioned tube.

The "convertible stethoscope" is a very simple arrangement for promoting the practical study of auscultation with both the single and the double instrument. It consists of a flat ear-piece; a shaft, nine inches in length, separable into two parts; and a flexible tube, with perforated wooden ear-plugs. These separate parts are all adapted to each other by the same simple joint; so that, by fitting them together in different combinations, four stethoscopes are produced.

1. An ordinary short stethoscope (Fig. 2), which is especially serviceable for the dorsal examination of patients confined to bed.

2. A long single stethoscope, adapted for subclavicular auscultation (Fig. 1). This form of instrument is often very useful in practice; for, by its length, the head is kept away from the face of the patient, and it also prevents uncomfortable stooping over the bed.

3. A double stethoscope (Fig. 3). The shaft of the short single tube completes the instrument. The ear-plugs are retained in position, without pressure, by adapting them to the size of the external auditory canal, and not by fixing them in the ears, as in the ordinary binaural, by means of an elastic band attached to the ear-tubes. This method removes at once some of the most common objections raised against the instrument. It prevents the uneasy sensation of pressure in the meatus, and also the friction-sounds which are often so perplexing to the student. The ear-plugs, moreover, are made in several sizes, to suit the varying capacity of the canal; and this is a little practical matter very necessary to remember in selecting an instrument. This will be found a very handy form of stethoscope. The chest-sounds can be examined with both ears, and then again with either ear alternately, by simply compressing the elastic tubes between the finger and thumb; in this way, the single and double auditory impressions may be conveniently compared and studied.

4. A double stethoscope, with an auxiliary cranial conductor. The conductor is formed by placing the end of the long shaft between the teeth, or on the forehead. In the latter method, the ear-piece is fixed on the shaft, for the purpose of increasing the area of the conducting surface. (Figs. 4, 5.)

The value of this additional channel for the purposes of auscultation can be very readily estimated by experiment. I have employed it for many months; and, it is my opinion, that the sonorous continuity of the cranial bones and auditory nerves may be utilised, as an auxiliary channel, during many kinds of physical examination. It gives a re-

markable clearness and distinctness to the auditory impressions; it assists in the definition of many feeble sounds; and it is particularly useful in the diagnosis of cardiac disease. The utilisation of this channel to increase the auditory impression, is theoretically correct. It is a well-known fact that vibrations, thus conveyed, not only produce an effect independently of the tympanic apparatus, but also that they appear to become intensified by an obstruction to the transmission of sound-waves through the middle ear, caused either by aural disease or by intentional plugging of the meatus. Now, when the double stethoscope is used in conjunction with the auxiliary conductor, the ears are in the most favourable condition for the reception of sonorous impressions in

Fig. 4.

this direction, as the canals are artificially plugged by the instrument itself. The activity of the tympanic apparatus, however, is not interrupted by this condition; for, when vibrations are transmitted through both routes at the moment, they react favourably upon each other; and the artificial obstruction of the canals, while increasing the direct cranial conduction, also intensifies the whole auditory impression. There may be considerable individual differences as to the susceptibility of the labyrinth for feeble vibrations, excited directly through the skull, and these variations may be detected without any apparent aural defect; still instances, in which persons of normal hearing power find a difficulty in appreciating auxiliary conduction, will be extremely rare,

Fig. 5.

and will always be removable by a little trouble and practice. The method of utilising the sonorous continuity of the skull and the auditory nerves, will prove a valuable aid to any who labour under unilateral tympanic disease. Sound, transmitted through the conducting apparatus of the middle ear, produces a greater effect upon the organ than when conveyed through any other medium; still, when the tympanic apparatus is injured, the vibrations of a solid body, in contact with the cranium, are heard distinctly louder on the injured side. This effect, which is constantly observed in chronic aural affections uncomplicated with disease of the nervous structures, is caused by the repeated reflections of the waves of sound in their outward passage from the tympanum towards the meatus. The auxiliary conductor will thus form a very serviceable addition to the double stethoscope, for those auscultators

who are unfortunately injured in the conducting apparatus of one ear. Under this condition, the ordinary channel of sound is obstructed, still the vibrations are not lost, but are utilised by direct transmission to the auditory nerve; and, in this way, they materially intensify the sensation received by the sound organ.

5. The convertible stethoscope is capable of another modification. It can be used as a differential stethoscope, by substituting two elastic chest-tubes for the single chest-piece. The double tube, introduced by Dr. Scott Alison some years since, is now used by many experienced auscultators in the diagnosis of cardiac disease. By its aid, sounds proceeding from two distant parts can be conveniently distinguished and examined, and a comparison obtained between any two points on the surface of the chest. Sounds are thus distinguished and separated by the ear, their position defined, and their relation to each other determined, both as regards character and time. It is a good plan to examine both points of the chest simultaneously, and then alternately; and also to obtain single and double impressions of the different sounds. For all the purposes of accurate definition and refined auscultation, the differential stethoscope is a very valuable instrument; but its application requires careful study.

In conclusion, I beg to express the hope that the convertible stethoscope may prove of value to some of my professional brethren. It is a very portable instrument, of few separate pieces, although it admits of many combinations; and I trust it will help the hardly pressed student of the present day to educate his ears, and obtain a practical knowledge of one of the most useful branches of our science. The instrument is made by Messrs. Arnold and Sons, of West Smithfield, and is supplied in a small case, so that it can be carried in the pocket very conveniently, and with more safety than the ordinary stethoscope.

IS SALICYLIC ACID A SPECIFIC FOR ACUTE RHEUMATISM?

By P. W. LATHAM, M.D., F.R.C.P.,

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In the courteous replies to the above question given by Dr. Strange and Dr. Lewis Shapter in the JOURNAL for December 24th, some doubt is expressed as to the meaning that should be attached to the word "specific". In my short note of December 10th, I certainly did not refer to the acid as "an infallible remedy for the cure of a disease", but limited its curative powers by the statement, that I regarded it as much a specific for acute rheumatism as quinine is for ague. There are remedies, says Stillé, "which may with propriety be called specifics, because each one presents peculiarities depending upon its essential nature or upon its association with an element possessed of specific powers. The most important article of this class is iron." (Stillé's *Therapeutics*, 4th edition, vol. i, page 448.) He then mentions cinchona and willow barks, saying, that the specific properties of the latter are "very feeble and, indeed, according to some, do not exist at all." In this sense I used the term "specific" in my question. Dr. Strange applies the same meaning to it, and answers the question in the affirmative.

Whilst, however, by no means maintaining that salicylic acid is an "infallible remedy", I regard it as something more than an "antidote". In my opinion it acts, not by neutralising or eliminating the poison (? lactic acid) which gives rise to the symptoms of rheumatic fever, but by actually preventing the excessive formation of the poison. In a communication which I made to the Cambridge Medical Society in November 1880, I forestalled the inquiry with which Dr. Shapter closes his remarks; for I then endeavoured to show that quinine and salicylic acid differ very essentially in their action: the first lowering temperature by simply impeding the carrying of ozone from the lungs to the tissues by the red blood-corpuscles—as in Binz's experiments with ozonised turpentine and guaiacum—and passing out of the system almost entirely unchanged; the other undergoing chemical change in the body, and being eliminated, in part at least, as salicylic acid. That this is only part of the change is shown by the fact that, when benzoic acid (which undergoes a similar change in the system into hippuric acid) is administered, it produces little or no effect. Salicylic acid, however, can be readily oxidised into formic and carbonic acids, which is not the case with benzoic acid; and this may help to explain the difference in their action.

The theory which I hold with regard to the pathology of acute rheumatism resolves itself into the following points.

1. A nervous centre exists, which controls the nutrition of the muscular and other tissues, and which has been termed the "inhibitory chemical centre".