abdominal cavity and from the heart blood. Two of the control pigeons were killed 36 hours after the injection. In both cases the abdominal cavity and heart blood were sterile.

These experiments definitely show that certain diets can render an animal susceptible to an organism to which under normal circumstances it is entirely immune. The reduction in temperature would seem to be the main factor in decreasing the resistance, though possibly the degenerative changes which occur in the bone marrow of pigeons fed on polished rice may also play some part, since it was noticeable that in the beri-beric birds the leucoblastic reaction in the bone marrow was less marked than in the pigeons with their temperature reduced by pyramidon. Further experiments are at present being carried out on the resistance of pigeons on deficient diet to other species of bacteria. It is of interest that in uncomplicated cases of beri-beri in man the temperature is often subnormal.

I am, Sir, yours faithfully,

G. MARSHALL FINDLAY,

Lecturer on Pathology in the University of Edinburgh.
Royal College of Physicians' Laboratory, Edinburgh,
March 27th, 1922.

THE GASTRIC JUICE AFTER THE AGE OF FIFTY.

To the Editor of THE LANCET.

SIR,—In an annotation in your issue of March 25th on the Effects of Alcohol on the Stomach on p. 597 appears the statement that Dr. A. O. Haneborg had found that "about every other apparently healthy person over the age of 50 had little or no free hydrochloric acid in the stomach." If such is the case in Christiania it certainly is not in England, as the following figures, based on an analysis of over 340 consecutive fractional test-meals performed for Dr. A. F. Hurst, 200 at New Lodge Clinic and 140 at Guy's Hospital, will show:—

Aged 50 and over	"Little or no free HCl"	$\frac{26}{104} = 25\%$
	Hyperchlorhydria	$\frac{46}{104} = 44\%$
Aged under 50	"Little or no free HCl"	$\frac{57}{237} = 24\%$
	Hyperchlorhydria	$\frac{58}{237} = 24\%$

I am, Sir, yours faithfully,

JAMES R. BELL, M.D. Melb.

Guy's Hospital, London, S.E.1, March 31st, 1922.

MEDICAL ORTHOPÆDICS: THE NEED FOR CLINICS.

To the Editor of THE LANCET.

SIR,—I should like to support as strongly as possible your plea for a continuation of the fine work in medical orthopædics commenced in the British military hospitals. The fruitful coöperation of physician and surgeon was nowhere better illustrated than in the departments for physical treatment in our war hospitals. Special surgical and medical advice, with systematic physical treatment (heat, cold, manipulations, exercises, electricity) were applied for the restoration of function: (1) in wounds and injuries, (2) in medical cases—rheumatism, arthritis, and circulatory and nervous disorders. Thousands of injured men passed through the "Red Cross Clinic for the Physical Treatment of Disabled Officers" and the physical departments at the Orthopædic Hospital at Shepherd's Bush. The benefit to the men under treatment was manifest, and perhaps the indirect influence and example of those pioneer institutions have been equally important.

Your leading article of March 18th, is a timely reminder to the profession that the experience gained in handling the disabilities of war ought to be applied to the problems of civil practice, which are essentially the same. What is true of arthritis is true of other

forms of disablement. "With a more complete system of orthopædic treatment, such as might well be instituted in connexion with Poor-Law infirmaries, much of this disability would be alleviated and much industrial capacity restored." And why stop short at Poor-law infirmaries? Are not arthritic, traumatic, paralytic, cardiac, and neurasthenic cases met with everywhere? Do we not every day in London feel the want of a well-equipped clinic, where, under the advice of a specialist visiting staff, new appliances could be provided and appropriate physical treatment given both in surgical and medical cases? Unfortunately, some excellent institutions for disabled soldiers were closed down and dismantled at the end of the war, without much regard to the needs of the civil population. All the appliances at the officers' clinic above mentioned were made over to the Ministry of Pensions, and with the measuring instruments and records have been dispersed. Absit omen. It is to be hoped that the more elaborate installations at Shepherd's Bush will now be permanently devoted to medical and surgical orthopædic treatment, for which but scanty facilities exist.

We can now surely realise that the re-education of disabled men and the restoration of their earning capacity is not merely a war-time problem. Convalescent and special hospitals, spas, re-educational centres, orthopædic or physical clinics, with the best possible advice, are all necessary if we are to cope with industrial disabilities, and indeed with invalids in all walks of life. But let it be remembered that equipment is comparatively easy to provide; sound organisation must follow, and that a right staff is the most important of all.

I am, Sir, yours faithfully,

R. FORTESCUE FOX.

Devonshire-place, W., March 21st, 1922.

ESTIMATION OF PHYSICAL FITNESS:

THE EFFECT OF DIAPHRAGMATIC TRAINING.

To the Editor of THE LANCET.

SIR,—There are points in Dr. A. A. Mumford's article with the above title in THE LANCET of March 11th which I think require criticism. The method of estimation of respiratory efficiency by examination of regional movements of the chest is of little value, as respiratory efficiency depends, to a very great extent, on the efficiency of diaphragmatic respiration, and it is only by efficient diaphragmatic respiration that the whole lung can be ventilated. The apparatus described by Dr. Mumford, though probably extremely useful in examination of the chest in disease, fails to give any indication as to the efficiency of the diaphragm and therefore fails to give any indication as to respiratory efficiency, which is so closely allied to physical fitness.

Movement of the lower thoracic region is not diaphragmatic breathing, although Dr. Mumford alludes to it as "so-called diaphragmatic breathing." In properly trained and efficient diaphragmatic breathing the lower ribs should hardly move at all, and the downward and forward thrust of the diaphragm should be seen in the epigastrium only. The movement in this region in expiration is also most important as an aid to the circulation and abdominal tone. It is surprising to see that Dr. Mumford found that the supraclavicular and manubrium regions moved most freely in subjects accustomed to make highly emotional efforts as in singing. The only explanation is, that the singers examined must have been badly taught, as they must have been accustomed to rely on accessory muscles of respiration, instead of the primary one—viz., the diaphragm. The type of singer who is taught to produce his effect by costal breathing never reaches a very high standard, as it is impossible to get the same power, resonance, or breath control as can be obtained by proper training in diaphragmatic breathing. In training the diaphragm the exercises should always be rhythmic. The value of diaphragmatic training as the true

means to acquiring respiratory efficiency can be best seen in the case of children who have suffered from tonsils and adenoids, and have consequently suffered from inefficient respiration, with all its attendant evils. They require to be taught to breathe; and with proper training in diaphragmatic respiration their circulation is augmented and metabolism is increased, with marked and rapid improvement in their condition.

I do not, of course, pretend that, to obtain respiratory efficiency, the diaphragm alone should be trained and the accessory muscles entirely neglected, but the fact remains that it is only by movements of the diaphragm that the whole lung can be ventilated, and that movements of the diaphragm can be increased and controlled by proper training.

I am, Sir, yours faithfully,

C. CASSIDY, M.B., B.Ch. Camb.

Gloucester Walk, W., March 25th, 1922.

ESTIMATION OF PHYSICAL FITNESS:

CLINICAL USE OF THE SPIRIT-LEVEL.

To the Editor of THE LANCET.

SIR,—An annotation on the use of the spirit-level in chest examinations, which appeared in THE LANCET of Jan. 21st, leads me to make a few additional observations. In the course of research work on orientation of the eyes, head, spine, and lower limbs in users of the periscope and gun-sighting telescopes, and in observations on some asthenopic scholars, I made use of the spirit-level as an indicator of slight degrees of asymmetry of shoulders and spine. The instrument which I employed is called a "notoscope"¹ and consists of a curved glass tube, with fluid meniscus (bubble)—the tube being furnished at each end with a flanged rubber buffer, notched at summit position of meniscus. On applying the instrument, changes in position of the meniscus enable one to appreciate lateral curvature of the spine before the advent of obvious dropped shoulder, lopsidedness or notalgia, and this without stripping the patient.

To apply the preliminary test the subject sits squarely on a chair, feet firmly planted. The surgeon is seated in front and hands the notoscope, steadying it the while, to the patient, who grips each rubber end with thumb and two fingers of either hand, forearms semi-flexed, elbows touching the thorax. The meniscus is then brought to zero, the breath being held. The patient is now told to inspire, when lateral curvature is indicated by the meniscus travelling towards the side of less restricted movement.

All scholars giving a positive result in the preliminary test are stripped and directed to stand with feet well apart, for examination of the spine and spinal movements, a tergo. The surgeon holds the notoscope steadily between the thumb and index finger of either hand, his abducted fingers resting on the patient's acromion and scapula spine (R and L) and brings the meniscus to zero position (resting phase); now the patient is told to inspire, and the meniscus swings over as in the preliminary test (positive result). If the breath be held at top of inspiration and the notoscope be then rotated on its short axis, until the meniscus returns to zero, such rotation provides definite angular measurement of the defect in range of movement of one side.

Remedial exercises introduced early by the application of this test may prevent tedious treatment at a later stage, and the spirit-level is useful in estimating the progress of treatment. The notoscope, it may be added, is portable and less bulky than a fountain pen.

I am, Sir, yours faithfully,

R. J. E. HANSON,

Hon. Consultant, Admiralty Illumination Committee.

Oxford and Cambridge Club, London, S.W. 1,
March 28th, 1922.

¹ From Mr. H. Kemp, 9, Thavies Inn, E.C. 1.

TREATMENT OF SCOLIOSIS BY REMEDIAL EXERCISES:

THE SKILLED AND THE QUACK "RUBBER."

To the Editor of THE LANCET.

SIR,—The annotation in your issue of March 18th (p. 545) on the above subject referred to a meeting of the Section of Orthopædics of the Royal Society of Medicine at which it was proposed, from the chair, that the Council of the Chartered Society of Massage and Medical Gymnastics be approached to form a committee to discuss the whole subject with representative medical men; and later, the hope was expressed that representatives of the Ling Association might also be invited to join in this conference. As a coöpted member of the Council of the former, and as an honorary member of the latter, may I express the deep sense of gratification felt by both at this public recognition of their status by medical men able to judge of services rendered in medical work. Would that this recognition were more general amongst medical men! Constantly we are told of the inefficiency of massage and other forms of physical treatment; but no less often do we hear that medical men make no inquiries as to the qualifications of those to whom the work is entrusted. Thus the highly trained and skilled physical therapist suffers untried, in the general condemnation often justly applied to the unqualified "rubber." A register is kept by the Chartered Society (157, Great Portland-street, W.) and by the Ling Association (10, Mecklenburg-square, W.C.) of their qualified members, and will be sent by the secretary to any medical practitioner on request. Both also maintain an employment bureau from which prompt information can always be secured as to the names and addresses of their qualified members in any area.

To be proficient in physical treatment no amount of personal or natural gift suffices. The essential training is long and strenuous: to employ those who have not had it is to court disaster. May I, therefore, plead through your columns for the protection of our patients from the unqualified—i.e., the quack physical therapist? Also, for a wider recognition, so freely and ungrudgingly given by the Section of Orthopædics of the Royal Society of Medicine, of the members of the two bodies to whose efforts medical men and the public owe far more than is generally appreciated.

I am, Sir, yours faithfully,

JAMES MENNELL.

Park Crescent, Portland-place, W., March 31st, 1922.

BRISTOL ROYAL INFIRMARY.—At the annual meeting of the governors of this institution a deputation was received from the workpeople of the Imperial Tobacco Company, to present to the infirmary a sum of money collected from the tobacco factories to purchase an electrocardiograph. There is a general desire on the part of the subscribers to this munificent gift that it shall be made available for the patients of the other institutions as well as of that in which it will be housed.

COLLECTIONS FOR HOSPITALS IN MANCHESTER.—The Manchester and Salford Saturday and Convalescent Homes Fund and the Manchester hospitals have agreed upon a scheme to raise funds by a systematic collection. It is agreed that in raising funds from employers and workmen at works no attempt is to be made to deprive hospitals of donations or existing subscriptions or of the benefit of collections already organised or arranged from workmen for the benefit of a particular hospital; but no new collections of the kind are to be organised or arranged by any hospital without the consent of the joint committee. This will consist of 16 persons, eight elected by the executive committee of the association and eight by the representatives of the hospitals. At the annual meeting held in Manchester on March 31st it was stated that the income for the year had been £14,843, as against £19,398 in 1920. In 1921 the workmen's weekly contributions for convalescent homes amounted to £10,528 and the sum for hospitals to £4121. The falling off in the income was attributed to the abnormal amount of unemployment.