tions and solutions in oil are apparently well absorbed in particles of this size in cats and dogs. If suitable conditions are found and absorption of drugs by the tracheo-bronchial mucous membrane is effected two great difficulties remain:

1. To give a therapeutic dose of a drug in an inhalation of moderate length.
2. To measure exactly the dose given.

Local Action

In the case of animals it has been shown that solutions in oil and water passed through a suitable atomizer, such as the Spiess-Dräger, are immediately absorbed. The droplets are deposited in a very fine spray over a great area, and it is unlikely that there will be injurious concentration on the tracheo-bronchial mucous membrane. It does not seem likely that drugs given for local action will therefore have sufficient time to produce any effect.

In view of the experiments with iodides and insulin on students doubt was felt as to whether the atomized liquid penetrated the tracheo-bronchial tree. Twenty-minute inhalations of 5 per cent. cocaine were given, the subject breathing alternatively through the nose and the mouth. It was impossible to demonstrate any diminution of sensation in the mucous membrane of the tongue, palate, fauces, post-pharyngeal wall, and nose, although these were rapidly tested as soon as the inhalation ended. The pupils, however, dilated; and there was complaint of a dry mouth and thirst.

Therapeutic Application

A small series of twenty cases of pulmonary disease were treated by inhalations. A Collinson inhaler was used. The rate of oxygen throughout was 10 litres a minute. A five-minute rest period alternated with every five minutes' inhalation. The length of a single inhalation totalled twenty minutes, and treatments were given twice a day. A record of results and a summary of the cases are given in Table II.

Analysis

Of seven cases of asthma two were completely relieved during attacks; the asthma attacks ceased. In one of these cases attacks recurred at once after discharge. One patient gained relief from earlier attacks while in hospital, but was later unaffected by inhalation. One case, given inhalation on admission, had no attacks while in hospital. Attacks occurred immediately on discharge. Three were not improved. In a twenty-minutes inhalation of apnengene, which contains adrenaline in strength 1 in 1,000 only, 0.35 to 0.4 c.cm. of solution is found to be atomized. Some of this probably escapes through the respiratory valve unabsorbed.

Of nine cases of chronic bronchitis two improved. In one case the improvement has been maintained throughout the summer. The other case rapidly deteriorated again after discharge.

Of five cases of bronchiectasis postural drainage was accelerated in four after inhalations.

In two cases of recovering congestive heart failure crepitations and diminished air entry at the bases were rapidly improved with camphengene inhalations. Subsequently camphengene was given by routine to all such cases, with improvement.

Conclusions

1. No evidence was obtained of the absorption of potassium iodide.
2. No evidence was obtained of the absorption of insulin.

3. Evidence was obtained of some influence of adrenaline on blood pressure when inhaled.

4. Inhalation of oxygen at a rate of 10 litres or more per minute led in most cases to a fall in blood pressure.

5. Evidence was obtained suggesting that inhalation of medicaments was of value in cases of chronic pulmonary congestion, but the results of treatment of a few cases of asthma and bronchitis were unsatisfactory.

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THE PHYSICAL WELFARE OF YOUTH

BY

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The questions of physical education and physical recreation are now much in the public mind. It seems desirable, therefore, that inquiries should be made into some of the factors which underlie a satisfactory conception of the issues involved. There is a tendency to forget that education and recreation are not ends in themselves, but parts of a total situation which is best comprised in the term "creative living." Nothing could be more fatal to the success of any scheme than an attempt to effect a division of the subject into watertight compartments.

An acknowledged authority on physical recreation recently suggested that a system of incentives was necessary if youths and young men were to be fired with the requisite enthusiasm for physical culture, and he proposed that the medical profession should lay down agreed standards of physique to which the male youth of the nation could aspire. On reaching the decreed stages of perfection they might then be allowed to distinguish themselves by some agreed title.

The Need of Incentives

The objections to some such arbitrary standard are not so obvious that they can be ignored, for if it is true that in the case of girls the operation of an incentive is undoubtedly responsible for a greater partiality to physical culture it might therefore be assumed that with youths something similar would be effective. The female regards beauty as an end in itself, possessed of very definite economic and biological advantages. The male on the other hand, at least in the industrial West, appears to regard the quest of bodily perfection as of considerably less importance, except in so far as athletic prowess is concerned, and he does not acknowledge that he owes it to himself, to his mate, and to the community to see that he develops his whole personality to the fullest. The incentive that operated in ancient Greece and Rome is lacking in large sections of our population to-day, and it is desirable that we should inquire how we may best create the quest of the beautiful that was once so potent along the Mediterranean coast. How can we most surely and effectively work towards realizing the ideal of a regenerated and upstanding people?

If incentives are needed, and it seems that they are, is there any other field in which to find them? Some suggest that national pride is adequate; others would invoke the objective of international contests in games and of sporting events in the air. The military aspect has been advanced, and a prominent soldier has even remarked that organized camping should be fostered with the dual aim of improving youthful health and military recruiting. However one may regard each of these suggestions they can at most affect a small minority—an elite—which would assume the role of potential gladiators

to entertain the passive majority. In questions of national health and well-being we are not concerned, or should not be concerned, with minorities, but rather with the great mass of youth, male and female, who not only have their own lives to live but who in the years to come will be the fathers and mothers of generations yet unborn. We have to consider the fitness of a people. Such fitness cannot be tested by any doctor, by special skill in any one sport, or by arbitrary standards, but only by the supreme test of mental and physical performance over the whole span of life. If this be our aim we are concerned with the whole man—with mind as well as body—and we cannot, if we would, remove individuals from their environment for special study. It is a case of the total situation or nothing, but before we turn to incentives and tests we must review the material to be tested or stimulated. Any gardener knows that you cannot raise a good plant from poor seed or from poor soil. If left alone, it makes a poor show; if forced, it withers early. To do any good in producing a fit people the environment and nutrition must be dealt with before there is any consideration of increasing physical effort. Once these two fundamentals are attended to much of the necessary incentive will spring from the *vis naturae* within each one of us.

Essentials of Good Nutrition

The greatest difficulty in assessing the physique of young people is to determine their state of nutrition. There are many proposed standards, but none is infallible. It is well known that the new armies in the last war showed marvellous stamina, but they had first-class rations to repair previous deficiencies. There would have been a different tale to tell had the troops been fed in war time exactly as they were fed in their own homes. There are good grounds for believing that very large sections of the people of England are inadequately fed. In the first place the organization and preparation of meals is sadly divorced from the physiological needs of those who eat them, so that, even where money is adequate, diet may be defective. Then there are thousands of homes where incomes are not sufficient to provide even the basic minima laid down by the B.M.A. scale. This has been demonstrated by the Committee against Malnutrition and by reports from areas where employment is scarce. Further, a large group of people take their meals in public places, where money adequate for home feeding fails to provide the necessary nutrition and is spent rather on providing a sense of repletion by the aid of excessive carbohydrates. Official complacency would have us disregard certain of these factors, especially if they involve spending additional public money, but no review of nutritional standards is of much value if it ignores the widespread defects in cooking what might otherwise be an adequate diet.

The domestic side of the problem reaches further than at first sight appears. The planning of housing estates could with great advantage be modified to allow of certain regional cooking arrangements, at least for the main meal of the day. A great deal of domestic drudgery could be eliminated by the community kitchen. Women in working-class homes have to spend far too much time in merely preparing and clearing away meals. Some relief is obtained by the use of tinned or pre-cooked food, but the general level of dietary suffers where its preparation is excessively tedious. The result is that food preparation is not at all in line with biological needs, and cannot be made so unless we are prepared to consider new methods. Much depends on the creation of the demand. The idea of the home as a place of recreative living will only dislodge the present acceptance of never-ending toil when people are educated to demand it. The cause of good feeding certainly stands to gain much, for it has little enough to lose, and should be a prime consideration in town planning for the future.

It is not possible to apply a wise system of extensive physical culture to a poorly fed body of youth, and despite many superficial indications to the contrary there is little doubt that only those who really feel fit for it are disposed to indulge in much physical exercise beyond that

necessary for earning a living. Even in the economic sphere much poor health and poor work is due to defective nourishment. Before we consider other aspects of physical culture we must face the realities of nutrition. Where the means exist for supplying additional milk, cod-liver oil, and even food to young people who appear listless, the resulting increase in health and vitality supplies the answer to any doubts. Numbers of these listless youngsters would pass superficially as adequately nourished.

Then comes the question of sleep. The loudspeaker has not helped in this direction, and the B.B.C. might with advantage broadcast from time to time reminders to parents and others that children must be allowed proper and undisturbed sleep. When we have faced these fundamentals, which are social problems of the first importance, then and then only can we initiate a national scheme of physical culture.

Preliminary Steps

Meantime there are certain things which can be dealt with as a preparatory contribution towards a full solution. A general scheme of planning is needed for the use of recreation grounds, which should be open all day on Sundays without any restrictions. Men and boys should be encouraged to play games in shorts without shirts. The conventions of flannel trousers and shirts for tennis and of anything more than slips for bathing should be discouraged. The contact of moving air on the skin is an even greater general tonic than actual exposure to direct sunlight. Hard tennis courts should replace grass, and industrial concerns might be urged to support community sports clubs which could be open seven days a week instead of running their own private clubs, except where no other facilities can be provided. Boys and girls at school should learn early the delight and benefit of playing their games as near to the nude as possible. Many may still object to this, but so long as the objection is upheld the cause of physical fitness will languish except among the enthusiastic minority. Extensive bodily exposure when atmospheric conditions permit is the ideal for all sports, games, and physical training; the sooner we reach it and the nearer we reach it, the happier and healthier shall we be. Only the quest of the beautiful and the competitive element between individuals will supply the really vital incentive to care for the body and to seek for full health. Beautiful bodies are not of much use under layers of clothes, and it remains a fact that in some girls' schools the pupils still wear more for "gymnastics" than they do for ordinary daily work.

An Ordered Sequence

At the back of any scheme of physical education there must be an ordered sequence of events from earliest childhood right away to old age. Men and women and young people need biological understanding, not limited as some think to questions of procreation, nor yet too academic, but sufficiently related to reality and yet comprehensive enough to help everyone to grasp the essentials regarding their place in the scheme of nature. This links the plan of physical culture with education on the one hand and with "constructive medicine," as Lord Horder so well calls it, on the other. Biology in schools is often confused with nature study. To learn about plants and birds and hedgerows is delightful and valuable, but what is urgently necessary is deeper understanding of the very elementary facts of physiology. Domestic science, cookery, and dressmaking classes only have real value if there is a grasp of the elements concerning the bodily functions which these matters subserve. Games, physical exercises, and sport in general must be linked up with some vital knowledge of the why and wherefore of physical reactions. That a dozen girls, taken at random, who had passed the London matriculation examination, and were considered by their parents as educated, should confess to absolute ignorance concerning the elements of human digestion is a serious reflection on much that even now passes as education. We are still turning out annually

from our schools thousands of children who in the realm of things that most matter are actually illiterate.

Young people are wisely looking for every possible means to reduce domestic necessities to an ordered and irreducible minimum, and girls rarely get any experience in housekeeping till they set up a home of their own. The new attitude to home life places a premium on the tin-opener; hence it is all the more necessary to know what tins to open. Both girls and boys should learn to cook attractive, nourishing, and simple meals. Both sexes ought to have as wide a physiological knowledge as their intellects permit, and if the school curriculum is too full certain academic subjects will have to give way. Good diction and singing are valuable adjuncts to self-discipline, and well-modulated voices uttering correct speech are as important as sound limbs effecting a graceful carriage.

Unless we place the physiological background of life on a sound basis at school we shall soon have a generation of potential parents who hate domestic life simply because they do not understand it, cannot co-operate in conducting it, and finally undernourish themselves and their children owing to sheer incompetence. Home life at its fullest and best need not be drudgery, but it can only become vital and creative if every child at school is given the necessary physical education, which applies to the environment just as much as to the body.

Many points could be elaborated, but this much suffices to show that, good as sporadic efforts at physical training may be, they lose their value by being either too isolated from the general stream of hygiene and culture or too neglectful of the basic fundamentals. Only a nation-wide scheme taking root in the schools, and embracing social hygiene, medicine, sport, and other forms of recreation, nutrition, and the improvement of domestic functioning can give us what we need. Let us start first at the unspectacular but necessary foundation so that in due time we may reap a rich harvest.

Aims of Physical Education

The youth movements of the Continent, especially in Germany, Italy, and Russia, lay great emphasis on organization. This is undoubtedly needful in the educative side of the work, in the laying of foundations, and the promoting of a conscience in respect of hygiene, but on the actual recreative side it is vital to allow youth a sufficiency of individual freedom lest we fall into the error of so mechanizing physical activities that in the process of building the beautiful body we damage the mind. The mind illuminates the body, and the search for fitness must be directed with a full realization that only in so far as we have a nation of courageous, free-thinking, freedom-loving people can we hope to maintain, let alone advance, the ideals of beauty that once flourished in Greece yet perished centuries ago because the people who held those ideals lacked the power of constructive social thought.

There is much confusion regarding the terms physical training, physical education, physical culture, and physical recreation. Surely they are facets of the same stone, but it appears as though there is a desire in certain quarters to ignore the full consequence of this realization. The youth of industrial States like ours is much at the mercy of harmful influences operating in an atmosphere of boredom or cynicism. The desire to combat these influences has led many well-meaning people to evolve superficial and patchwork remedies which ignore the fundamentals. Youth can be exploited just as easily by well-meant as by harmful influences, and some of the proposals for physical recreation give the impression of being conceived mainly with an idea of just keeping young people out of mischief. This is a negative ideal, and is doomed to failure. Then again political motives of a certain type seem to aim at keeping young people content with the *status quo* merely by removing the more glaring instances of bored idleness, while some people think that by exercising the body the mind can be kept inert, and this they regard as desirable.

Physical education in its fullest sense, however, opens up new vistas of life and gives a new outlook on the world. It is a theme running through the whole educative process, and is hostile not only to a too narrowly academic or vocational type of education but also to any social system which fails to develop to the fullest extent the potentialities that exist for a full life. Much of the ideology behind the renewed interest in physical development ignores this or, if not ignoring it, seeks to pacify and even quell the questing spirit of youth. The heroes of the modern world are courageous innovators armed with knowledge, health, and vigour. They represent the hope of the future. Innovation, however, is harmful and useless unless it aims at creative ends and is guided by an inner discipline based on tolerance and culture. Such a discipline can be fostered by a proper understanding of the functioning of body and mind in the natural world. Hence broad elementary biological teaching is essential as a foundation of physical education. Let us realize that physical education is neither a stunt nor a "subject." It is a theme that must run right through the whole of the preparation of life and the living of it.

New Ideals for Old

The grave question of backward children and the related problem of juvenile delinquency is closely connected with the present topic. Proper nutrition, proper social surroundings, and proper understanding of the underlying facts are most likely to receive the attention they deserve from a people in serious search for beautiful and healthy living. The proper functioning of our complicated economic life demands that the utmost be obtained from every individual, and new ideals must replace the old if this is to be attained.

At all costs narrowness of view must be replaced by a broad biological outlook; in discussing physical education, recreation, or training man must be looked on as a biological entity with roots in the past and tendrils stretching out to the future. The total situation demands recognition, and thus social environment, physical surroundings, and mental atmosphere must all be placed in their correct position as parts of a coherent whole. Only in this way can we build a healthy nation. Piecemeal, short-sighted patchings, forcings, and evasions will not only fail to produce what is desirable, but may even play into the hands of those who are not devoid of ulterior motives in their handling of the problems of youth. Bored youth, disciplined to keep it quiet, exercised beyond its physiological means, and encouraged to find its psychological outlets in organized endeavour which stultifies individual thought, is just the soil from which in years to come a mentality will be fostered which may lead us towards war rather than towards a creative and enduring peace. Rightly developed, physical education can do more than any other single factor to lead us over and beyond nationalism towards a true brotherhood of man, making the utmost of the conquest of nature through the agency of virile, independent minds enshrined in healthy, vigorous bodies. Once mankind has learnt to value human loveliness, it will hesitate to turn its energies to destruction, mutilation, and death.

D. P. Bowe and D. C. Wakeman (*Journ. Amer. Med. Assoc.*, August 22nd, 1936, p. 577), who report a personal case, state that, although there is an abundant literature on tularaemia, there has been no careful study of the disease as a complication of pregnancy. Their case was that of a woman, aged 40, in the fifth month of pregnancy, who contracted a mild attack of ulcero-glandular tularaemia from skinning a rabbit. The apparent effects on the course of pregnancy and parturition were a moderate hypochromic anaemia and uterine bleeding, probably due to extensive placental infarction before the onset of labour. The infant showed no signs of disease, apart from agglutinins in low dilution (1 in 80). The post-partum course was uneventful.