most powerful in this respect, the fats the least effective,

and the carbohydrates stand between the two.

(b) Muscular Work.—Numerous experiments have shown that the influence of muscular work upon the temperature range is a most powerful one. Since heat production is greatly increased by all kinds of muscular work, its influence upon the temperature range is, briefly stated, that it moves it downward. Near the upper limit of the range we may reach a point where a man may be able to exist while at perfect rest, but where every attempt at work will lead to heat accumulation and heat stroke and other pathological conditions.

(c) Clothing influences the temperature range by pushing it a certain number of degrees downward; it has, then, upon it an influence similar to that exerted by eating

and muscular work. The salient points of our subject have now been brought forward as thoroughly, we believe, as the scanty allow-ance of space will permit. We will simply add the con-clusions arrived at by Ranke from a most self-sacrificing set of experiments which he made upon himself and published in the monograph already referred to. They are:

1. The temperature optimum of the European, in moderate clothing, lies between 15° and 18° C. (59°-64.4° F.), providing that the other climatic factors exercise no undue influence at the time.

2. In a climate with an atmospheric temperature be tween the optimum and 22° C. (72° F.) an increased water evaporation begins to show itself, but no decided influence upon nutrition is yet noted.

3. In a climate of a temperature of 25° C. (77° F.) and on the assumption that other climatic factors are without great influence, a diminished desire for food begins to become manifest; the amount of food taken sinks to that of a man doing very light work.

4. The climatic effect still rising, the amount of food taken sinks below the need of an adult at rest and in a state of hunger. The proteids remain constant, and every further diminution occurs at the expense of fats and car-

5. If, against the instinctive diminution in the desire for nourishment, food is forcibly taken in greater amount than is desired, pathological changes in the general health, rises in the temperature, and a decreased resistance to infectious diseases will occur.

6. If, on the other hand, the quantities of food taken are permanently diminished in accordance with the demands of a tropical climate, as is usually the case, a deficient nutrition of the organism is the inevitable result, with all the dangerous consequences that follow in

From these conclusions and from the preceding discussion, the leading principles that must govern the composition of a ration or the diet of a man who has transferred his residence from a temperate to a tropical climate may be easily inferred. The details of it are subjects of special research.

A sea climate is perhaps more nearly a purely solar climate than any land climate can ever be. A solar climate is defined as a climate which would be characteristic of every degree of latitude, if the earth was a mathe matically perfect spheroid without unevenness, and had throughout the same composition. This is true at least for the great oceans. Although the value of the total mean thermic effect of the climate, which the seaman is exposed to as long as he confines himself to the limits of his ship, has not yet been determined with scientific accuracy, it may be safely said that that value is less than one found over a corresponding latitude on land. It would most undoubtedly be modified by the ship, especially one of the modern battleships, in which every part has a climate of its own and which must be regarded as a heat-producing body; nevertheless, the total mean effect on deck will be found to be considerably less detrimental than the corresponding shore climate. With the aid of a few thermometers, psychrometers, anemometers and some interest and experience in scientific investigations, this work should present no difficulty. Until

it shall have been done, any expression of opinion on the influence of the climate in which the seaman lives, upon his heat economy, and upon the composition of his ration,

IV. RECRUITING.

Recruiting for the navy signifies the separation by a medical officer of the physically fit from the physically unfit, of the mentally sound from the mentally unsound, of good timber from bad timber, for a most serious and mportant service, the common defence of the land and its people against a danger threatening their commerce and their liberty from the direction of the sea. Every physician in the land should be familiar with the principles and practice of recruiting, and recent experience has demonstrated the fact that every medical man in the country is liable to be called upon to do this duty. Whatever else there may be connected with the process of enlisting a man in the navy or army, the point of gravity in the duty of re-cruiting lies in the medico-physical examination of the recruit; but to perform this duty properly requires some knowledge as well as practice. We shall be obliged to limit ourselves here to giving a very brief outline of some

of the more important principles involved.

To begin with, it is a mistaken notion to presume that any individual with a normal heart and a good pair of lungs must necessarily be a fit candidate for the navy. There are indeed many other points of equal importance which the examiner must keep constantly in mind while scrutinizing a candidate. Besides seeing to special parts in the anatomy of an individual, he must look at the man as a whole. Generally speaking, a fine form symmetrically proportioned, good development, regular features, a good clear eye, a frank and open countenance, convey an impression that is rarely misleading; they form an index to the inner life of the man, usually favorable. On the other hand, asymmetry of face and body, irregular development and features, the stigmata of degeneration in at least fifty per cent. of the cases are unfavorable in this respect. They would indicate an abnormal deviation from the average, the juvenile offender in the young, the hardened criminal and repeater in the adult. navy can no longer be considered a reform school for the juvenile offender nor a prison for the cure of the hardened adult criminal. Neither the time nor the training can be given in the service to such objects, however noble, and there are other institutions, maintained by the state, the special function of which is to attend to these

Besides good physique, the man, to be of any real and permanent value to the service, must bring with him right from the start a good will, a high sense of duty and responsibility capable of further training, all of which he must be prepared and willing to maintain during the entire term of service to his country and his flag. This may be aiming high, but many years' experience, both in recruiting and in surveying the unfit, have proved to my satisfaction that the service is not benefited but injured by anything below such a standard

The British Navy .- The only other navy with which our own can be compared as regards the system of recruiting is the British navy. Although the system of conscription for the army has-until recently at any rate-always been considered in England to be a detestable and insuf-ferable encroachment on individual liberty, sailors have at all times been regarded as bound to serve in the royal navy. If they did not enter the service voluntarily, they were simply pressed into it by the press-gang, often very ruthlessly and cruelly. These press-gangs, commanded by officers, were sent into the ports to seize all available seamen. The man, thus forcibly enlisted, had a small coin (the Queen's shilling) pressed into his hand, and it is from this circumstance that the name press-gang is said to have been derived.

This peculiar method of recruiting the navy, scorning,

peace after Waterloo, when humanitarian principles were taking a strong hold on all civilized communities, no attempt was made to abolish the press-gang. Down to the middle of the nineteenth century English admirals declared that the press-gang was one of the props of the

greatness of England and absolutely indispensable.

By that time public opinion resolutely and persistently objected to this forcible enlistment, so that in 1852 the Admiralty was forced to adopt new methods for the recruiting of seamen for the navy—methods which turned out to be highly beneficial, leading as they did to a thoroughly beneficial reform in the manning of the navy and to a very superior personnel at the same time. The royal navy of Great Britain and the navy of the United States are now both recruited on the voluntary system, while in the continental naval services the system is by con-

scription.

The average of volunteers has invariably been found superior to that derived from those who were driven into the service either by force or by necessity or who entered for reasons of convenience. So far as the navy of the United States is concerned, its personnel has markedly improved during the last twenty-five years, and the general public is beginning to look upon the naval uniform with both pride and affection instead of as a mark of de-

For the details and the nature of the physical examination required in both services, the reader is referred to Appendices I. and II., at the end of this article. Every physician may well be supposed to be familiar with the technique of the examination.

The Recruitment of Officers.—This presents several rather interesting as well as instructive differences in the two services. In the English service, considerable stress is laid upon the circumstance that the young naval candidate possesses a good family origin and connections. Under the more democratic form of government f the United States, this principle of selection does not prevail. Then, again, the promotion to the higher grades of com-mand rank does not proceed by seniority in England as it does in the United States, but by selection.

There is, then, a certain amount of selection at both ends of the line in the British service that does not exist in the United States naval service. Besides, the cadet as well as midshipman in the British service is obliged to defray not only all his private personal expenses but also to pay from fifty to seventy-five pounds a year for his schooling. Thus there is, in addition to the above, a money qualification. In both services alike there is a physical and a competitive mental examination, in both of which the candidate must be successful before he can

Granting that a certain amount of this selection which characterizes the British service as distinct from the United States service is done from motives of interest other than the best of the service, we must perhaps d-mit that the resulting average, thus carefully selected, may in the end be for a steady and constant improve-ment of their service after all. Even the least important of the qualifications, the money qualification, may not be altogether without a certain value as a principle of selection. If we regard, for instance, the possession of a certain amount of this world's treasure by the lad's father or other relatives as representing a certain amount of brain power which must have been expended at some time in order to accumulate it, the natural conclusion would be that the boy had inherited a part of this same brain power, in a facultative state, in the same natural way as he will some day inherit the accumulated ancestral pos sessions. We may, moreover, further assume that early training might do much to divert this power into other channels; in other words, turn the lad into a successful naval officer as his ancestor had proved himself successful in other ways.

In the free and unhampered competition in the civil life of a republic like that of the United States and in the general scramble or struggle of the masses for social pre-

people of England that, even during the long period of | ferment, high official position, professional distinction, or financial betterment, almost any individual will in the end find his level, in accordance with his natural and inherited endowments, his abilities, acquired through education, and the use which he makes of them. The gifted, industrious, physically and mentally fittest will easily rise to the top, while the physically weak and the mentally deficient will, as naturally and according to the same law, gravitate to the bottom of this sea of human life and of the multitude. The process of natural selection in the social sphere of human existence has full sway

In naval and military life, in countries where all are supposed to be born equal but are not, and in which se-lection on the principle of true merit and ability has been found either inconvenient, impracticable, or impossible, where artificial barriers are created and placed in the way of the advancement of organized merit and ability, the results must very naturally be somewhat different. While, perhaps, a high and uniform level of efficiency on the part of the individual members of such a body of men may not be inconsistent with such methods, an extremely dangerous dearth of leaders must, nevertheless, remain the inevitable result of such a system, a dearth most keenly felt at the most inopportune moments of national trials and tribulations.

In view of the above facts and considerations the process known as recruiting, being practically the only generally recognized and accepted method of selecting those who are fit for the service from those who are not, becomes of an importance all the greater. From this viewpoint the physical examination of the recruit, more especially, however, that of the cadet, must appear in an entirely new light and one which, in its far-reaching importance, it would indeed be difficult to exaggerate

The Significance of Selection by Means of a Physical Examination.—With the aid of a physical examination, as this is understood at the present day, the scientifically trained and practically experienced examiner is able to select, from a given number of candidates, a group not only superior in physique, but also, and at the same time, one superior in mental qualifications to the remainder. He can, moreover, by the same means exclude the criminals, criminaloids, and the degenerates.

It has been shown by a series of observations in different parts of the United States and other countries, made by Porter, Christopher, Hastings, Beyer, and others, that children and youths who have inherited an exceptionally good physique almost invariably also manifest mental qualifications that are likewise superior. All these obervations, made by different observers and by means of different methods, have led to such uniform results that the correlation must seem unavoidable to any unprejudiced observer and the application of the principles involved to the process of recruiting follows as a most natural corollary

A necessary preliminary step to the application of these principles to recruiting is the preparation of tables according to the percentile grade system of Francis Galton from as large a number of subjects as possible and from ubjects (men and boys) of as nearly the same type as those with whom the candidates under consideration are to be compared. Such tables may include any number of measurements and tests. While height, weight, and chest circumference must be regarded as absolutely essential other dimensions are very desirable.

The tables published in "The Growth of United States Naval Cadets," United States Naval Institute No. 74, include a number of tests and measurements in various dimensions; they will, therefore, do good service in the examination of cadets. The adjoining three tables (XXII., XXIII., and XXIV) were made from 6,901 sailor-men and boys, and may, consequently, be said to be fairly representative of the physique of that class of people who have at all times applied for enlistment in the naval service. Since, however, the averages must be preponderatingly made up from the descendants of Anglo-Saxon and Teutonic stock, the examiner will still have

TABLE XXII.—HEIGHTS IN PERCENTAGES.

										Was Interested			
Agro	Number of ob- servations.			VALU	E IN INCH	ES AT THE	FOLLOWI	NG PERCE	NTILE GRA	DES.			Averages.
Age.	Nu of serv	5	10	20	30	40	50	60	70	80	90	95	A
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35	124 305 288 99 158 129 745 931 662 351 531 514 395 350 356 318 250 166 170 165 136 119	59.35 60.58 61.27 62.22 62.38 63.19 62.70 62.54 62.56 62.25 62.25 62.25 62.14 62.32 61.83 62.04 61.65	59.87 61.23 61.29 62.76 63.24 63.42 63.42 63.42 63.43 63.25 63.26 63.26 63.26 63.26 63.26 63.26 63.28 63.28 63.28 63.28 63.28	60.66 62.06 63.71 64.09 64.24 64.30 64.48 64.18 64.46 64.32 64.31 64.21 64.21 64.21 64.23 64.21 64.23 64.28 64.38	61.60 62.88 63.70 64.34 64.91 64.96 65.28 65.28 65.28 65.24 65.24 65.24 65.24 65.24 65.24 65.24 65.24 65.24 65.24 65.26	62.54 63.46 64.83 65.51 65.53 65.95 65.92 65.91 65.94 65.66 65.70 66.15 65.45 66.18 65.42	66.37 64.01 64.87 65.43 65.68 65.84 66.10 66.31 66.45 66.22 66.22 66.22 66.34 66.18 66.63 66.64 66.64 66.14	64.13 64.62 55.41 66.08 66.08 66.30 66.73 67.07 66.82 67.07 66.82 67.97 66.94 66.94 66.92 66.92 66.92 66.93	64.82 65.33 65.96 66.67 67.26 66.76 67.36 67.75 67.58 67.65 67.40 67.47 67.81 67.83 67.83 67.80 67.80	65.77 66.19 66.83 67.35 67.35 67.41 68.02 68.51 68.30 68.30 68.38 68.31 68.41 68.56 68.54 68.56 68.59 68.59 68.59	66.87 67.31 67.39 68.35 68.46 68.97 69.59 69.48 69.37 69.36 69.57 69.36 69.41 69.38 69.41 69.38 69.49	67.92 68.07 69.26 69.22 69.92 69.91 70.41 70.16 69.95 70.52 70.28 70.52 69.94 69.46 70.37 70.61	63.8 64.7 65.5 66.0 66.4 66.5 66.7 66.9 66.9 66.9 66.9 66.9 66.5 66.7 66.5 66.5 66.7
Total,	6,901										-1084		1

TABLE XXIII.—WEIGHTS IN PERCENTAGES.

-											to the store little	tok war and	A 5 100 (200 to 1)
Age.	Number of ob- servations.			VALU	E IN POUN	NDS AT TH	E FOLLOW	ING PERCE	ENTILE GR.	ADES.			Averages.
	Nu of serva	5	10	20	30	40	50	60	70	80	90	95	Av
15 16 17 18 19 20 21 22 23 24 25 27 28 29 30 31 32 33 34 35	124 305 288 99 158 129 7745 981 662 651 551 514 395 356 356 318 250 166 170 165 136 119	86.80 97.08 103.13 102.90 111.95 109.45 116.47 118.73 121.52 117.11 120.62 118.94 120.00 116.80 119.56 120.88 122.46 117.50 120.75 117.60 117.85	89.70 101.21 107.69 108.90 115.90 116.45 119.97 122.67 124.83 122.34 124.10 124.10 124.75 127.27 124.53 125.53 125.53 123.80 124.80 124.30	95,95 104,89 111,60 113,80 120,30 123,90 124,44 128,15 129,83 130,13 131,45 131,80 131,20 131,20 131,20 131,60 130,30 130,30 130,30 130,30 130,30 130,30 130,30 130,30 130,40	102.33 108.13 115.77 119.70 124.23 127.34 128.59 133.05 135.68 134.30 135.76 137.00 135.78 137.30 135.78 135.88 137.97 135.80 138.80 140.90	105.84 111.56 119.68 123.53 126.30 130.12 131.92 135.92 137.85 138.15 139.33 141.08 141.63 141.63 144.28 139.88 144.28 149.55 144.43 144.28 149.55	109.00 114.42 122.60 124.94 128.45 133.90 134.90 140.85 143.87 144.81 146.27 144.32 144.09 146.20 149.00 145.67 149.71 149.38	111.35 116.73 125.58 131.47 130.96 137.57 138.81 143.88 144.22 145.86 147.53 148.17 150.75 149.18 149.01 151.71 153.52 151.50 155.17 154.86 155.80	117.80 122.50 129.27 134.66 134.53 140.47 143.59 147.80 148.24 149.75 152.92 154.93 156.32 157.60 159.00 159.00 159.00 159.00	123.05 127.18 133.34 139.20 138.90 143.40 147.44 154.24 155.23 157.44 159.90 161.60 163.00 165.27 164.50 165.27 164.50 169.52	129.44 134.12 139.82 147.10 147.70 153.77 163.36 163.10 162.82 166.60 168.17 169.64 175.13 177.13 177.13 177.13 177.10 176.50 184.40 178.20	133.80 141.72 142.72 155.25 152.55 160.55 160.92 173.11 170.95 170.36 173.30 176.42 177.50 184.70 179.07 180.42 183.50 184.70 179.84 189.40 199.15	109.5 111.0 127.9 131.6 130.6 131.6 131.5 141.5 149.0 137.4 145.6 146.0 148.3 144.9 146.6 151.0 147.5 150.1 152.8 150.8
Total,	6,901	BANK BE	STATE OF	The Lates		The same					THE REAL PROPERTY.		

TABLE XXIV.—CIRCUMFERENCE OF CHEST IN PERCENTAGES.

			TABLI	E XXIV	.—CIRCU	MFEREN	CE OF C.	HEST IN	TERCEN.	TAGES.			
Age.	Number of ob- servations.			VALU	JE IN INCH	IES AT THI	E FOLLOW	ING PERCE	NTILE GRA	DES.		N-W	Averages.
	Nu of serva	5	10	20	30	40	50	60	70	80	90	95	AV
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35	124 305 288 99 158 129 745 931 514 385 350 356 318 250 166 170 165 136 119	27.02 28.10 28.76 29.13 29.54 29.57 30.23 30.73 31.02 30.92 31.29 31.23 31.12 31.12 31.43 31.43 31.43 31.99 30.99	27.48 28.23 29.28 30.14 30.13 30.83 31.35 31.57 31.57 31.57 31.59 32.08 32.08 32.09 32.29 32.20 32.30 32.30 32.30 32.30	28.29 29.12 30.42 30.72 31.73 31.50 32.13 32.39 32.38 33.01 32.92 32.92 32.93 33.48 33.48 33.32 33.60	28,91 29,53 30,31 30,89 31,21 32,08 32,08 32,98 33,30 33,54 33,53 33,73 33,30 33,73 34,07 34,15 34,15 34,28	29.50 29.92 30.92 31.35 31.61 32.02 32.62 33.09 33.51 33.77 34.08 34.23 34.33 34.39 34.39 34.71 34.69 34.26 34.79	30.07 30.40 31.34 31.80 32.00 32.50 33.14 33.62 34.07 34.17 34.29 34.67 34.83 34.83 34.83 34.83 34.95 35.27 35.27 35.26	30.53 30.95 31.60 32.28 32.46 32.49 33.60 34.17 34.55 34.65 35.24 35.38 35.38 35.78 35.76 35.76 35.76	30.99 31.36 32.26 32.80 32.93 33.53 34.06 34.77 35.12 35.15 35.77 35.90 36.34 36.30 36.34 36.52 36.54 36.66	31.76 31.83 32.57 33.33 33.56 34.11 34.70 35.72 35.81 36.51 36.73 36.83 36.66 37.00 36.41 36.77 37.23 37.39 37.84	32.72 32.36 33.69 33.85 34.76 35.57 36.61 36.73 36.73 36.94 37.56 37.77 37.77 37.77 37.77 37.72 38.13 37.14 37.98 38.73 39.01	33.31 33.51 34.51 34.68 34.94 35.52 36.38 37.43 37.70 38.33 38.77 38.86 39.57 39.30 39.46 39.67	30.8 31.9 32.4 32.6 33.0 33.6 33.2 34.6 34.8 35.2 35.3 35.4 35.6 35.6 35.8 35.8 35.8
Total,	6,901			1			1000000				1	The same of	

to use his judgment as regards the type of man before him in adjudging his relation to the averages given in the tables. Such tables are to the examiner what the compasses are to the navigator. One or two examples will perhaps help to make this clear.

Example I. A boy presents himself and his nearest birthday makes him fifteen years old. The measuring rod gives his height as 63.4 inches, the scale shows that he weighs 109 pounds nude, and the tape measure around his chest, taken at the level of the nipples, shows that his chest circumference is 30 inches. Looking now at the tables, along the line of averages obtained from boys of his age (fifteen) we shall find that all these figures fall under the fifty percentile grade. What does this indicate and what is his physical relation or standing when thus compared to the rest of the boys of his age? It means that out of one hundred boys of his age, our candidate is taller than forty-nine and not so tall as the remaining fifty above him; the same is, of course, true for weight and chest circumference. In other words, our boy is an average or mean, boy for his age

boy is an average, or mean, boy for his age.

Example II. Our second boy is sixteen years old, his height is recorded as five feet and one inch, his weight as 105 pounds, and his chest circumference as 29.5 inches. Our tables show him to be ten per cent. in height, twenty per cent. in weight, and thirty per cent. in chest circumference. These several percentages added together and averaged make him a twenty-per-cent. boy: 10+20+30 = \frac{60}{3} = 20. In this manner a boy's physique in its relation to that of all the other boys of his age and type is brought out and the physical examiner gains an idea of the probable relation of his candidate to the rest of the community. Although it is, comparatively speaking, a rare occurrence that a recruit is found to have all his measurements fall under the same percentile grade, it is nevertheless also a fact that, whenever such is the case, our candidate shows a perfectly symmetrical development.

It has been found over and over again that the curves constructed from a number of children and youth, measured and averaged in this manner, when compared with the curves from their mental examination marks received at school, run very nearly parallel. An undoubted correlation between the physique and the mental performances of children and youths is hereby fully established and the application of the principles involved to the selection of territy mode appeared.

lection of recruits made apparent.

The minimum standards of height, weight, and chest circumference required from boys intending to enter the navy, as given in Appendix II., are all of very low percentage, when compared with the percentile grade tables, and cannot, therefore, be said to serve any purpose of selection. If notwithstanding these low limits we get a class of men into the service that is better than our requirements would indicate, this would seem to have been obtained in spite of and not with the aid of our examinations

There seems to be nothing better established and recognized by prominent army surgeons—e.g., Greenleaf, Woodhull, Munson, Woodruff, Tripler, and others—than that the lowering of the physical standard is invariably followed by a lowering of the moral standard.

Notter also believes in the correlation between the physical and the moral standards. Men of defective development are noted for the time which they spend on the sick list, in confinement; they are also known to furnish by far the greatest number of deserters

furnish by far the greatest number of deserters.

The following table (XXV.), showing, as it does, that the percentage number of deserters has steadily increased since 1895, except during the war of 1898, would, if attributable to faulty recruiting alone, indeed be a revelation. But, although recruiting undoubtedly has its share in the production of such a large percentage of deserters, a careful and unbiassed inquiry would no doubt result in tracing such wholesale desertions to a variety of causes. Such an inquiry, if it were made without fear or favor, would throw valuable light on the subject.

Mr. Arthur H. Lee (Nineteenth Century Magazine, 1901), of being perhaps the only workmen known who make it

TABLE XXV

	NAVAL	FORCE.		Number	Same in per cent.	
Year.	Ameri- can.	Foreign.	Total.	of deserters.		
1895. 1896. 1897. 1898. 1899. 1900.	5,720 6,126 14,838 11,446	5,280 5,219 4,990 5,386	10,000 11,000 11,345 22,828 16,832 18,000	888 1,041 1,357 1,317 2,452 3,100	8.8 9.5 12.0 5.8 14.6 17.2	

treating on the "recruiting question," says of the English army, where the standard had been lowered several years in succession: "Owing to the poor quality of the recruit enlisted, it ensues that less than 47 per cent. ever serve their full term; the remaining 53 per cent. are completely lost to the service and the country after an expensive training and a few years' inefficient service." "Owing to the same cause, the annual number of desertions has risen from 3,357 to 6,378." "Owing, moreover, to inefficient recruiting, at least 10,000 men disappear annually from the ranks of the army, for no valid cause beyond moral and physical unfitness." "The pecuniary loss to the nation from this cause alone is over 100,000 pounds sterling per annum, which, in my opinion, might be entirely obviated if the proper men were enlisted to beer in with."

Mr. Lee's fundamental contention is, that the physically and mentally developed man is not only incomparably the better soldier, but is much the cheaper in the end.

Lord Kitchener has several times loudly complained of

Lord Kitchener has several times loudly complained of the poor and useless quality of recruits sent him to South Africa, and Kulp, from his recent experience, remarks. "The undersized, underfed, and underdeveloped boys one sees invalided from South Africa are not at all representative of the sturdy English race."

resentative of the sturdy English race."

Thus it would seem that a lowering of the physical standards in order to increase the number of enlistments does not add to the value, the strength, or the efficiency of an army and is an unrecessory at the first public services.

of an army and is an unnecessary waste of public money. Since there has been at all times a large percentage of men of foreign birth in the navy, it is interesting to note the difference in physique between that class and the native-born American. The adjoining table (XXVI.), calculated from—as nearly as that could be done—an equal number of both groups and of the same age (twenty-one) shows that, while the Americans have a slight advantage in height in almost all the percentile grades, the foreign-born American seaman has a more decided advantage in both weight and chest circumference.

TABLE XXVI.—AVERAGES OF 350 AMERICAN AND 316 FOREIGN BORN (ALL TWENTY-ONE YEARS OLD) COMPARED.

	HEIGHT	INCHES.	WEIGHT,	POUNDS.	CHEST CIRCUMFERENCE.		
Per cent.	Ameri- can.	Foreign.	Ameri- can.	Foreign.	Ameri- can.	Foreign.	
5 10 20 30 40 50 60 70 80 90 95	62.91 63.50 64.48 65.27 65.96 66.52 67.06 67.61 68.21 68.94 69.86	62.61 63.40 64.30 64.86 65.40 65.93 66.63 67.34 68.05 68.88 69.52	113.2 116.9 121.5 125.0 128.0 131.4 135.0 139.1 143.5 149.4 157.2	115.4 119.5 124.5 128.5 131.5 134.7 138.4 142.2 147.5 159.2	29.4 30.2 31.0 31.5 31.9 82.3 32.7 33.2 33.7 34.5 35.2	30.3 31.0 31.7 32.3 32.8 33.3 33.6 34.3 34.9 35.9 36.7	

The Significance of War to the Nation and the Race.—It is said of physicians that a large portion of their work is directed toward the prevention of disease rather than to the cure of it, and medical men have the rare distinction of being perhaps the only workmen known who make it.

their first duty to stop the sources of supply whence they derive their income. To prevent disease and suffering is, nevertheless, the highest function of hygiene and one of the noblest aspirations of modern medicine. If we look upon wars as preventable causes of disease and suffering and of death, it would seem to be one of the func-tions of naval and military hygiene, not only to modify if not altogether to exterminate bullets, as we are trying to annihilate germs, mosquitoes, and other disease-pro ducing agencies, but also to try to devise means for the final abolition of war itself. The gradual reduction in the calibre and the change in shape of the new small-arm projectile seem to be a step in this direction. In the same sense arbitration, may some devices the characteristics. sense, arbitration may some day fill a chapter in a work on hygiene, and the great peace conference at The Hague, called into being by the august ruler of all the Russias a few years since, would then constitute, historically speaking, the first great international attempt at promoting the fundamental interests and purposes of naval and military hygiene. War undoubtedly is the greatest and most merciless destroyer of the best there is of human life. The history of every war-like nation usually ends in the extinction of the best of that nation. Greece died because the men who had made her glory had all passed away; leaving none of their kin, they left none of their away, fearing not of the day are the sons of those of whom she could make no use in her conquest of Asia. Indeed there is strong ground for the statement that there was more of the old heroic blood of Hellas in the Turkish army of Edhem Pacha than in the soldiers of King George who fled before them five years ago. The cause of the fall of Rome has been traced to the

extinction of the best of her race through her numerous conquests; only cowards remained and from their brood came forward the new generations, and even Cæsar noted the dire scarcity of real men, and "vir," the real man, be-

came "homo," a mere human being.

"Send me the best you have," said Napoleon; "I want
men, not boys." Since the time of the French Revolution and the Napoleonic wars, French skulls may be found piled up in Italy, Austria, Germany, Russia, Egypt, and Spain. They are the skulls of the best men that France had sent into the field. It was only after these were gone that the great general began to call for boys, saying, "A boy will stop a bullet as well as a man," and these died without leaving any offspring. From that time onward the men of the hoe became the fathers of the present men of France. M. Legoyt thinks it will take long periods of peace and plenty before France can recover the tall statures moved down in the wars of the republic and of the first Empire.

Mr. Arthur Knapp, in his work entitled "Feudal and Modern Japan," says: "It is astonishing to find that after more than six generations, or more than two hundred years of peace in which physical courage has not been demanded, these virile powers in the Japanese should be found unimpaired." The student of history, however, finds that this is just what he would expect, for, in times of peace, there is no slaughter of the strong, no sacrifice of the brave and courageous. It is in accordance with the laws of natural history and is proven by all the records of human history that the nation which has seen the least of war always develops the strongest battalions.

Germany, always systematic and thorough, taking advantage of the lessons taught by scientific research, and, guided by the best principles of the times, guards her men and reduces the waste in war to a minimum, by the strictest attention to scientific hygiene. She is military rather than warlike. In modern times, the greatest loss to Germany has occurred through emigration, not through wars. The tendency of all emigration, whether from country districts into towns in the same country or from one country to another, has always been to weaken those left behind. Ammon has shown, for Germany, by measurements, that the average of those who emigrate is superior to the average of those who stay behind. Quetelet has shown that in some towns of Belgium the average

stature was a little higher than in the country. Dunant found this to hold good with respect to the inhabitants of Geneva as compared with the country people around. Villermé, Manouvrier, and others have shown that the stature of the Parisian conscript is higher by 8 or 9 mm. than that of the men belonging to the rural arrondisse ment of the Seine. Germany has long since recognized this, and hence her struggle for colonies, the possession of which alone can save her ever-increasing population to her flag. It is want of room and lack of opportunity that drive her sons to foreign shores, not fear of military

Holland has become a nation of old men. Her sons have died in the fields of Java, and Batavia alone is said to have one million of Dutch graves. Dutch armies are to-day recruited elsewhere, Holland will not waste any more of her own blood.

"Spain died of empire years ago. She has never really crossed our path, it was only her ghost which walked at Manila and Santiago. The warlike nation of to-day is the decadent one of to-morrow" (David Starr Jerdan, Forum, 1901).

As long as the physician cannot prevent the occurrence of disease, he will have to continue trying to do his best to cure it; as long as war will continue to recur, a nation will have to face the foe. Since, however, the most skilful physician for the care and treatment of disease will in the end prove the least expensive to the family, so the best sailor and soldier will invariably prove the more remunerative to the state. To bring a war to a speedy and successful termination, a nation must offer as recruits, and be willing to sacrifice, the best she breeds. Henry G. Beyer.

APPENDIX I. Requirements for Enlistment in the British Navy.—
The British navy is enlisted upon the Voluntary System. The seaman
must have a good physique, though height, apart from a good development, is considered of no advantage. While no physical examination is required for the merantile marine, none but promising lads
are accepted for the training ships of His Majesty's navy, and persons
of whatever age or class found to be laboring under any of the undermentioned physical defects or deformities are, by Article 1154 of the
Admiralty Instructions, 1899, considered unfit for the service:

(a) A weak constitution, imperfect development, or important malformation or physical weakness, either hereditary or acquired.

(b) Skin disease, temporary or trivial; extensive marks of cupping,
leeching, blistering, or of issues.

(c) Malformations of the head, deformity from fracture or depression of the bones of the skull, impaired intellect, epilepsy or paralysis
or impediment of the speech.

sion of the boiles of the speech.

(d) Blindness or defective vision, imperfect perception of colors, or any chronic disease of the eyes or eyelids.

(e) Impaired hearing, discharge from or disease of one or both

ears. (f) Disease of nasal bones or cartilage and nasal polypus. (g) Disease of throat, palate, tonsils or mouth; cicatrices of neck, whether from scrofula or from suicidal wounds; unsound teeth or seven teeth missing or defective in persons under seventeen years of age; ten defective or deficient teeth in persons above the age of

seventeen.

(h) Functional or organic disease of the heart or blood-vessels, deformity of chest, phthisis, bronchitis, hæmoptysis, asthma, dyspnœa, chronic cough, or any evidence of lung disease or tendency thereto.

(i) Undue swelling or distention of the abdomen; disease of liver, spleen or kidneys, hernia or tendency thereto, incontinence of urine,

synhils or gonorrhoea.

(j) Non-descent of either or both testicles, hydrocele, varicocele, or any other serious defect or malformation of the genital organs.

(k) Fistula of anus, hemorrhoids, or any disease of stomach and

wels.
(1) Paralysis, weakness or impaired motion, or deformity of either (t) raralysis, weakness of impaired motion, or deformity of either extremity, including varicosity of veins, especially of the leg, and distortion or malformation of hands, feet, fingers or toes, (m) Distortion of spine, of the bones of pelvis, no matter whether from injury or disease, or from constitutional defect.

APPENDIX II. Requirements for Enlistment in the United States Navy.—Briefly stated, the physical requirements for enlistment in the United States navy are as follows: The candidate must be of good physical proportions, and, if accepted, is required to take oath before enlistment that he is not subject to fits and has no concealed diseases. Any of the following conditions are sufficient to cause the rejection of an applicant: Greatly retarded development; feeble constitution, inherited or acquired; permanently impaired general health; depraved condition of general nutrition; liability to any disease; chronic diseases or results of injuries sufficient permanently to impair efficiency—such as weak or disordered intellect; epilepsy or other convulsions within five years; impaired vision or chronic disease of the ears; chronic or offensive nasal catarrh; tumors of the nasal passages or great enlargement of the tonsils; marked impediment of speech; decided indications of liability to pulmonary disease; chronic heart affections; rupture; non-appearance of testicles; dropsy of testicle or cord; stricture, fistula or hemorrhoids; large

varicose veins of lower limbs, scrotum or cord; chronic ulcers; cutaneous and communicable diseases; unnatural curvature of the spine; wryneck or other deformity; permanent disability of either of the extremities or articulation from any cause; defective teeth; the loss or extensive caries of four molar teeth.

In addition to the above, candidates for enlistment as apprentice must at least fulfil the requirements of the following table of minimum measurements:

Age in years.	Minimum height.	Minimum weight.	Minimum chest circumference.
14	4 feet 9 inches.	70 pounds.	26 inches.
15	4 feet 11 inches.	80 pounds.	27 inches.
16	5 feet 1 inches.	90 pounds.	28 inches.

NAVAL MEDICAL SERVICE.-I. NAVAL MEDICAL DEPARTMENT.—Historical Notice.—"The Marine Committee" of the Continental Congress made provision at an early date for a medical department of the navy, and declared "the care of the sick and wounded to be objects of great solicitude." In the "Rules for the Regulation of the Navy of the United Colonies," adopted November 28th, 1775, this service was defined. After the completion of the revolutionary struggle slow progress was made, until 1794, when the entire naval service was augmented; yet at this time the medical departments of the army and navy were one, under an officer who bore the title of physician-general. Not until 1828 were the medical departments of the army and navy divided. In 1842 the bureau of medicine and surgery of the navy department was created, and W. P. C. Barton was nominated its chief. By the act of 1871 the entire service was reorganized, the grades of medical director, and medical inspector created, and the title of surgeon-general, with the relative rank of commodore, conferred on the chief of bureau. In March, 1898, this officer was given the rank and title of rear-admiral.

The organization of the medical corps of the navy is essentially that created by the act of 1871, and amended by the acts of 1898 and 1900.

The grades, ranks, and titles in the medical corps of the navy, compared with that of the line of the army and navy, is shown in the table prepared by Medical Director Gihon, as modified by existing law.

U. S. ARMY.	U. S. NAVY.				
All Officers.	Line.	Medical Officers.			
LieutGeneral. Major-General Brigadier. Colonel LieutColonel. Major Captain. lst Lieutenant.	Admiral. Rear-Admiral Captain LieutCommander. Lieutenant Lieutenant (Junior Grade).	(Surgeone (Innier)			

By the act of 1898 positive rank was conferred on all officers of the medical corps of the navy, and in 1900 assistant surgeons were given the rank of lieutenant (junior grade), corresponding to first lieutenant in the army.

The titles, grades, and numbers in the medical corps

of the navy are as follows, viz.: 15 medical directors, 15 medical inspectors, 55 surgeons, and 105 in the combined grades of passed and assistant surgeons.

The number of officers in the grade of passed assistant

surgeon is not limited, the law providing for promotion of assistants after three years' service.

The surgeon-general does not constitute an extra number, but is chosen from the grade of director or inspector for a term of four years, being eligible to reappointment. All officers of the navy retire on reaching the age of

Examination and Appointment.—A candidate for entrance into the medical corps of the navy must be between

the ages twenty-one (21) and thirty years (30). He appears before a board, which is under oath to report on his physical, mental, moral, and professional qualifica-

Appointments are made in the order of merit reported

The examination is: (1st) physical: (2d) mental, consisting of (a) written, (b) oral, (c) clinical, (d) practical, and embraces about six days.

The board of medical examiners sits permanently at the Naval Hospital, New York. Prior to 1897 no examination was required from the grade of passed assistant to that of surgeon, but under present law examinations occur with each promotion. The examination for the grade of surgeon relates largely to an officer's experience attained in the lower grades. It comprises the following subjects: (a) Naval regulations, in so far as they pertain to the medical department; (b) thesis on general and naval hygiene; (c) thesis on clinical medicine; (d) practical bacteriology and chemistry; (e) microscopy and microbi-

ology; (f) military surgery.

The flow of promotion is dependent upon resignations, dismissals, retirements, and deaths.

Officers reaching the grade of surgeon at this time (1900) have been in the service about ten years. The disposition of officers entering the corps depends upon the exigencies of the service; if these permit, they are ordered to receiving ships, and gain some preliminary knowledge of the duties and life at sea. The percentage of those given permission to appear before the board of examiners, who pass, is small. Thus, of the twenty-two candidates who presented themselves during the fiscal year ending in 1896, four were rejected physically, twelve were rejected professionally, and six were found qualified for the position of assistant surgeon. It cannot be concluded from this statement that the examination is unduly rigorous, but rather it is indicative of insufficient academic study and a lack of thoroughness in the professional equipment, which we fear is far too common a condition among the graduates of a large number of medical schools in the United States.

The compensation of officers of the medical corps is

that of their corresponding rank in the line, and is shown as follows:

PAI IABLE.								
	At sea.	On shore.	Allowances per annum.*					
Assistant Surgeons : Rank of Lieutenant (Junior Grade)	\$1,650.00	\$1,402,50	\$288.00					
Passed Assistant Surgeons:			1000000000					
Rank of Lieutenant (Junior Grade)	1,650.00	1,402.50	288.00					
After five years in the service	1,800.00	1,530.00	288.00					
Rank of Lieutenant	1,980.00	1,683.00	432.00					
After five years in the service	2,160.00	1,836.00	432.00 432.00					
After ten years in the service	2,340.00	1,989.00	452.00					
Surgeons: Rank of Lieutenant: After ten years in								
the service	2,340.00	1,989.00	432.00					
After fifteen years in the service	2,520.00	2,142.00	432.00					
Rank of Lieutenant-Commander: Af-								
ter ten years in the service	3,250.00	2,762.50	576.00					
After fifteen years in the service	3,500.00	2,975.00	576.00					
Medical Inspectors, rank of Commander:		0 100 00						
After fifteen years in the service	4,000.00	3,400.00	576.00					
Medical Directors, rank of Captain:	(-00 00	0.00= 00	720.00					
After fifteen years in the service Surgeon-General, rank of Rear-Admiral.	4,500.00 5,500.00	3,825.00 5,500.00	720.00					

The hospital corps of the navy was authorized by an act of Congress, June, 1897, thus securing for the service skilled men for the care of the sick and wounded.

The hospital corps consists of the following grades and rates: (a) Pharmacists, warrant officers; (b) hospital stewards, chief petty officers; (c) hospital apprentice, first class; (d) hospital apprentice, second class.

* Only when quarters are not furnished by the Government. Eight cents a mile is the allowance when travelling under orders.