DRILL IN THE UNITED STATES NAVY.

In the frequent discussions which take place upon the question of the personnel of modern navies it is a common complaint that the present day man-of-war's man is not the thoroughgoing seaman that his forerunner was in the days of the sailing frigate and the three-decker. The complaint is urged not merely against the navy, but it includes the whole merchant marine. It is claimed that, with the entrance of steam and the passing of masts and sails, the able seaman lost his occupation, developing into a mere laborer, for whose round of daily tasks there was needed neither skill nor intelligence.

Now, although there is a small measure of truth in the statement as applied to the navy and a large measure of truth in it as concerning the merchant marine, the case is not quite so strong as many pessimistic writers would have us believe. Of course it cannot be denied that, as far as pure seamanship in the popular sense of the term is concerned, there was more of it to be learned in early days aboard a Bon Homme Richard or a Constitution than there is to-day upon a Brooklyn or an Indiana. To keep an old three-decker up to concert pitch—and with rare exceptions they were maintained in splendid condition both below and aloft—was a task that gave its crew hard work and plenty of it, besides requiring a considerable amount of technical knowledge and skill.

The coming of the age of steam has practically dismasted the battleship and has very largely turned the sailor into a mechanic. It has also undoubtedly lightened the daily labors of the crew, and this to such an extent that it has become necessary to institute special drilling exercises with a view to keeping the men in good physical condition. Not that the daily drill is a new institution, but there is a tendency among naval officers to give it a more prominent place in the daily routine and bestow upon it more thought and care than was formerly the case.

At the same time it must be admitted that the change from sail to steam, from wooden hulls to hulls of steel, from cast iron smoothbores to rifled breechloaders, has brought on board certain new duties which to a certain extent compensate for those which have passed away.

Any visitor who may chance to be aboard a United States warship at 9:30 in the morning or at 5 or 5:30 in the afternoon will see the crew going through a series of arm and leg exercises and ending it usually by a run on the double in single file around the deck. This is what is known as the "setting up" drill, and it is in universal use throughout the navy. The drill is carried out as laid down in the manual of infantry tactics, and, in the case of most ships, lasts about ten minutes, though in some cases it is extended to ten or twenty minutes. The movements are similar to those used in any course of calisthenics, and, as its name implies, it is intended to straighten up the men, expand the chest, square the shoulders and give them that erect carriage and alert movement which are supposed to distinguish the naval and military man from the civilian. The setting up drill takes place regularly at the hours named on every day of the week.

There are a number of other drills which differ from the setting up drill in the fact that they not merely give muscular development and erect carriage to the men, but have to do with the working of the ship and the guns. These are practiced in their order on different days, so that the whole course is gone through once in a week. Among others may be mentioned the gun drill, the rifle drill, which is similar to that carried out in the army, the pistol drill, fencing or the broadsword drill, the artillery drill, practiced aboard those ships which carry field guns, in which is included the landing drill, the collision drill, in which the men are trained in the use of the collision mats, etc., the "abandon ship" drill, in which the crew are taught how to leave a sinking ship without disorder or panic. In addition to these the crew are drilled in the arming and equipping of the boats, and also receive sailing and rowing instructions.

In all this instruction there is, of course, a fair amount of exercise, for the various operations are carried out exactly as they would be in actual service. Thus, in the gun drill, whether it be at a small 6-pounder rapid fire gun or in the turret of a 60-ton gun, the detailed movements of opening the breech, raising the ammunition through the hoists—dummy shell and powder charge being used—ramming home the charge and sighting and firing are gone through with precision, every man being in his proper place and station.

As we before stated, however, there are many naval officers who consider that more time and attention could profitably be given to development drill, that is, to drills which are intended to develop the chest and muscles and give to the seaman something of that old time agility for which he was distinguished in the days of the sailing ship. Accordingly, in some few of the ships the setting up drill has been varied and extended according to the ideas of the officers on board, and in every case the changes have been in the direction of making the drill more interesting to the men and more gymnastic in its effects. By the courtesy of Lieut. W. R. Rush, of the U. S. S. Brooklyn, we are enabled to present our readers with instantaneous views of the various movements of a drill which he has introduced on that fine ship. Of the sixteen movements shown, one-half are done without arms and the remainder with the rifle. It should be mentioned that there are altogether eighteen points in this drill, or two more than we have shown, and the whole set is gone through in regular rhythm and time. The movements are so well chosen that there is not a member or muscle of the body that is not exercised, the arms, legs, hips, shoulders and chest being successively and specially brought into play by the different movements.

On the battleship Maine, Captain Sigsbee, who is an ardent advocate of the adoption of a more extended system of drilling in the navy, is having the men taught the full Development Drill as carried out at the United States Naval Training Station, Coasters' Harbor Island. This drill, which began with the Swedish movement, has been tried on various occasions, and Admiral Bunce, when some years ago in charge of the training station at Newport, investigated the system, and had it standardized for use on shipboard. When Captain Sigsbee was in charge of the training ship Portsmouth he had the system taught in its entirety, this being the first time that it was adopted in any ship afloat.

The value of this drill when it is thoroughly carried out lies in the fact that it is very precise, and the rhythm of the movements is maintained in such a way that it rivets the attention of the men to the drill-master. Moreover, by its indirect effect the Development Drill is a great assistance to the other drills on board ship. The drill is divided into five sections: Free exercises, leg work, body work, arm work and extension exercises. No apparatus is necessary, though at the training station each man uses a pair of light wooden dumbbells.

There are usually from two to four counts to one movement, and the counts are repeated over rapidly so as to insure a total series of sixteen to twenty-four counts at one time. To give a clear idea of the method we quote from the manual the following movement, known as the vertical push:

"Count 1. Jump the feet apart, at the same time swinging the dumbbells between them.

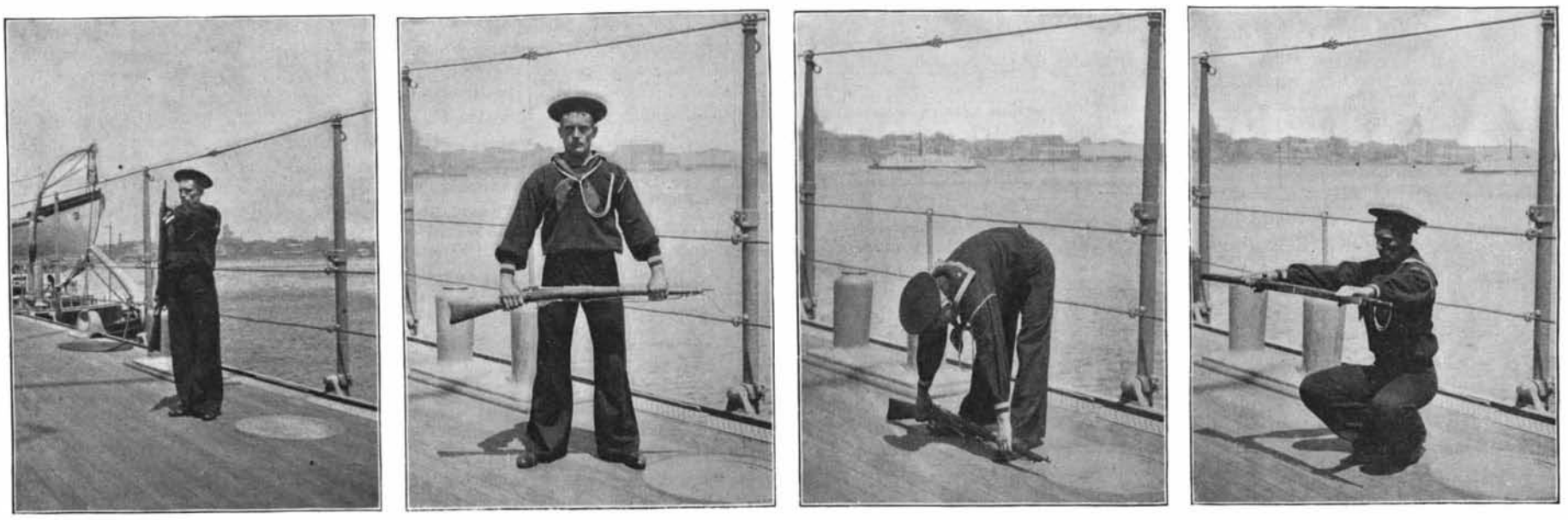
"Count 2. Jump feet together, at the same time bring bells to top of shoulders, elbows back and on the same level as the shoulders.

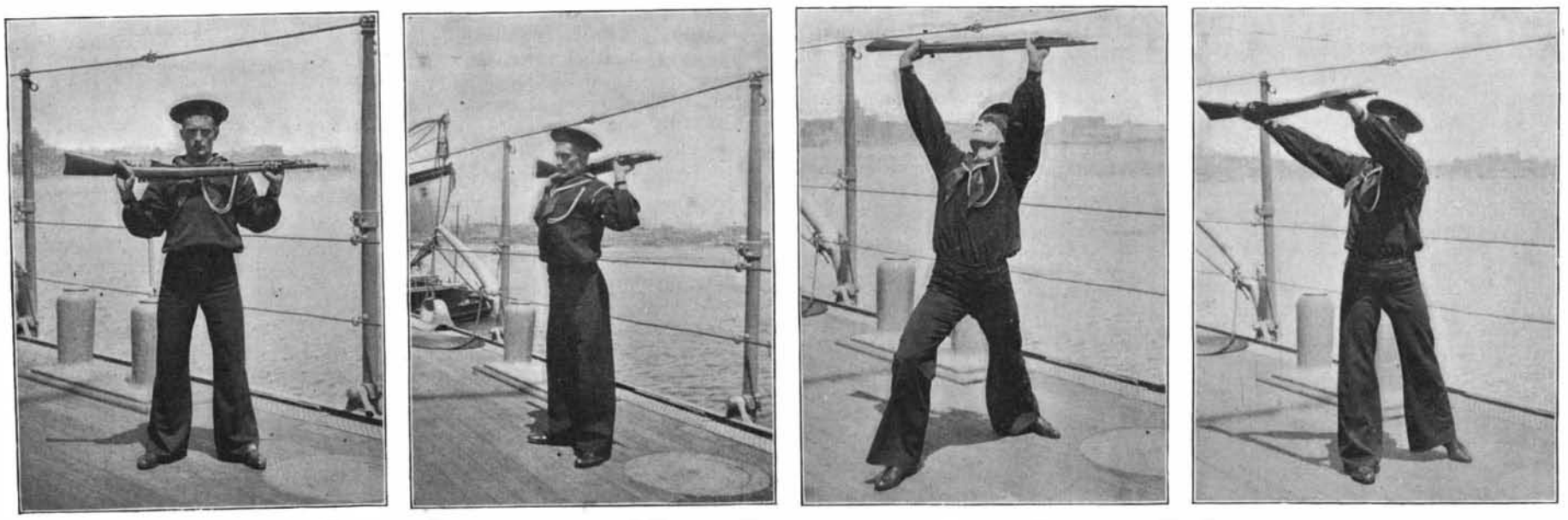
"Count 3. Push to a high vertical, striking bells together, palms in, elbows stiff and upper arms close to ears.

"Count 4. Back to position in count 2."

This movement acts on the inside of thighs, side walls of chest and top of shoulders.

In conclusion it should be noted that these exercises,





DRILL ON THE UNITED STATES ARMORED CRUISER BROOKLYN—WITH ARMS.

simple as they appear to an onlooker, really call for an astonishing amount of energy. Captain Sigsbee states that even a gymnast, if he were unused to the movements, would have to take a rest before he could go through the whole series as given in the Training Station Manual.

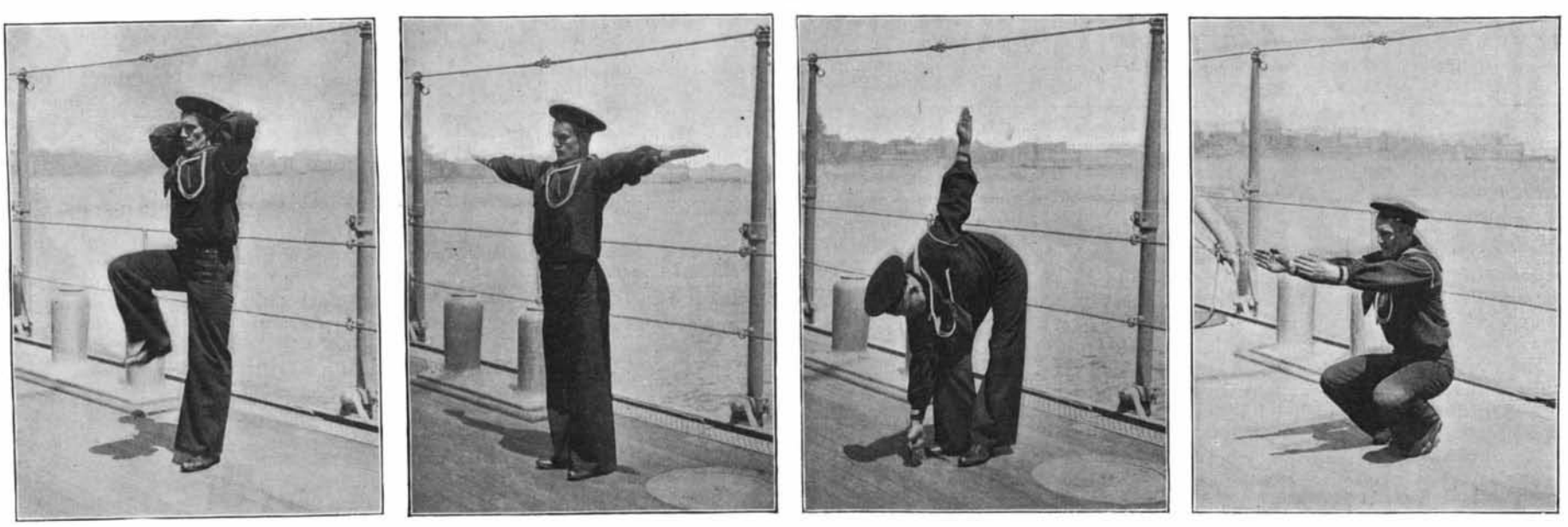
Causes of Sudden Death.

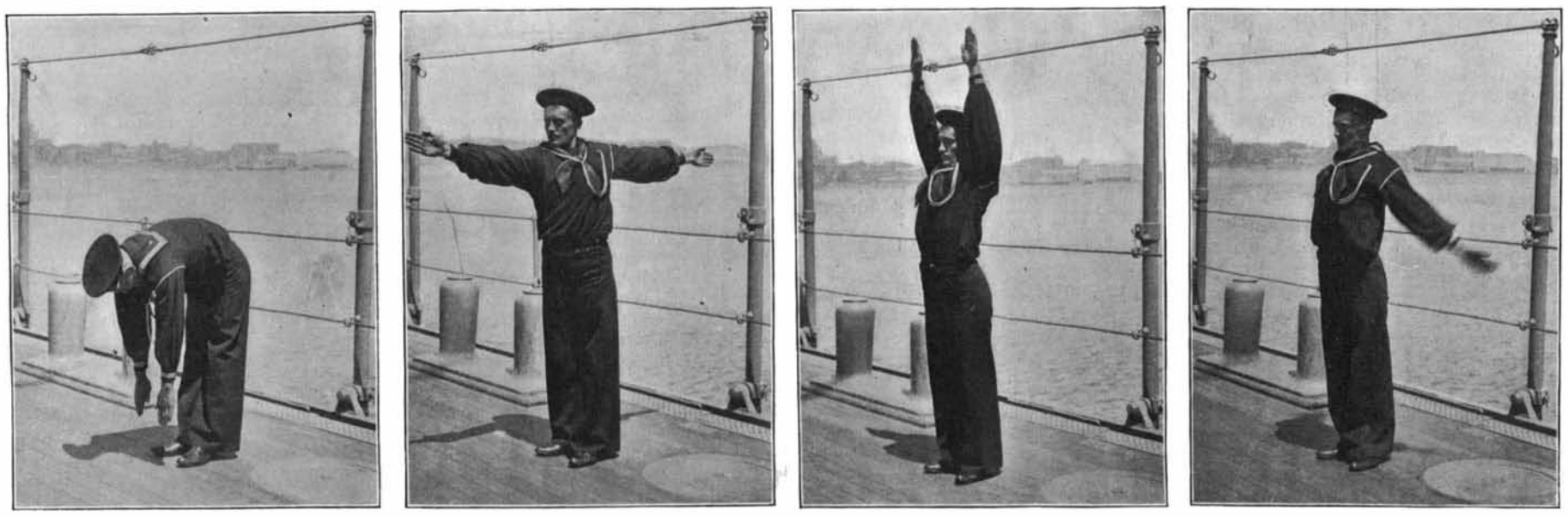
Roughly speaking, about one-half of the total number of cases of sudden death from natural causes in adults is, more or less, due to heart disease, which has existed for some time, and in which no further change is in progress at the time of death—such as valvular disease, angina, fatty heart, and sclerosis of the cardiac muscle from chronic myocarditis. In many cases concurrent lung or kidney disease complicates the statistics, such cases frequently being tabulated as deaths solely due to heart disease. Spontaneous rupture of the heart, mostly in men, may exceptionally occur; the left ventricle, often toward the front, is almost invariably the seat of the rupture. It is to be remembered that in traumatic rupture of the heart the right side, usually the auricle, suffers more frequently than the left in the proportion of about as 70 is to 54. Apoplexy and other cognate brain lesions rank second as natural causes of sudden death. It is to be noted that miliary aneurisms of the vessels of the brain, although most common in persons past middle life, occasionally occur in young people, even in children, and by bursting cause death from apoplexy. Chronic alcoholism, a potent factor among the causes of sudden death, is frequently associated with rapidly terminating heart and brain disease.

Asphyxia, a not unfrequent cause, may be due to œdema of the glottis, membranous deposit in the trachea, pressure of a neoplasm on the trachea, spasm of the vocal cords, pulmonary embolism, air embolism, rupture of a vessel or of an aneurism into the air passages, asthma, whooping cough, pneumo and hæmo thorax, pleuritic effusion, and epilepsy. The rupture of a gastric or intestinal ulcer, of an aneurism, of a varicose vein, of the surroundings of an ectopic gestation, the formation of a peri-uterine hæmatocele, may severally prove quickly fatal. Nephritis (uræmia and apoplexy), diabetes, exophthalmic goiter, and Addison's disease may also terminate with unexpected rapidity. Hemorrhage into the pancreas occasionally causes sudden death, apparently from the impression produced on the contiguous nerve centers. It is most common in males over forty years of age who may up to the occurrence of the hemorrhage to all appearances be in perfect health. Obesity, the habitual use of alcohol, and the presence of heart disease appear in many of the cases to be predisposing causes. Koetschau, however, observed hemorrhage into the pancreas in a woman—an alcoholic—in her twenty-fourth year. Occasionally it occurs in spare people who are free from obvious disease and who are abstemious as regards alcohol. The sufferer may die within half an hour after the occurrence of the hemorrhage, or he may survive for twenty-four or even thirty-six hours. Draper records five cases between the ages of twenty-six and fifty-five years, of which three were men and two women. Fitz tabulated sixteen cases, of which eleven were males between thirty-one and seventy years of age, and five were females between twenty-six and forty-seven years.

Sudden death has in instances followed spontaneous rupture of an enlarged spleen, the result of tropical malarial influences, the individual immediately before rupture being to all intents and purposes quite well. Pellereaux gives the history of thirteen cases of rupture of the enlarged spleen; in five the rupture was spontaneous, and in the remainder it was due to apparently inadequate causes, such as a simple fall in the street. It is to be borne in mind that when the spleen is thus enlarged a mere pat with the palm of the hand may determine rupture and consequent speedy death, which, in the absence of a knowledge of the experience of others, might readily be assumed to be the result of criminal violence.

It is to be remembered that some of the above named diseases may exist without giving rise to any symptoms until the fatal moment arrives; this applies with special force to diseases which have a prolonged course, during which, as a rule, symptoms indicative of the disease declare themselves. Such a disease is gastric ulcer. I have seen more than one case in which, until the fatal rupture occurred, absolutely no symptoms were experienced, not even such as might have been attributed to simple dyspepsia; in one such instance a second ulcer was present in the walls of the stomach in addition to the one that ruptured and caused death, and yet until perforation occurred the patient never felt any abnormal sensation whatever.—J. D. Mann, M.D., in London Lancet.





DRILL ON THE UNITED STATES ARMORED CRUISER BROOKLYN—WITHOUT ARMS.

Astronomical Weather Predictions.

Mr. A. J. Devoe, predicating his predictions on astronomical causes, believes that a cyclone will occur from the 10th to the 15th of August, the severest part being along the eastern coast of England and Scotland and may extend over the North Sea.

A second cyclone will be due between August 25 and 30 off the coast of North Carolina and move northward, while in Ohio, between August 25 and 28, there is to be a tornado. A similar storm should occur over the southeastern part of Europe, followed by unusual floods.

Government's Costly Archives.

Those persons who are interested in the archives of the government, but do not know what they are, are told by a correspondent of the New York Times that they include some very costly as well as interesting papers. The papers of George Washington, in 336 volumes, cost $45,000. James Madison's papers, in 75 volumes, were purchased for $25,000. The papers of Thomas Jefferson, in 137 volumes, were acquired at a cost of $20,000, besides $6,000 appropriated for their publication. Sixty-five volumes of Alexander Hamilton's papers, bought for $20,000, were also published at a cost of $6,000. The papers of James Monroe, consisting of 22 volumes, were bought for $20,000. Benjamin Franklin's papers, in 32 volumes, were bought in 1882 at a cost of $35,000.

Although the government paid $165,000 for these papers, they are regarded as priceless. Still, they are not so valuable as the papers of the Continental Congress, which are included in the collection of the Department of State. These and other historical papers of great and fascinating interest to the student of history are kept in part for the study of the historians of the future, and are accessible under proper guards and restraints to all who believe they have occasion to consult them.

Ribbon Books for the Blind.

Prof. D. Wallace McGill, at a convention of the Missouri National College Association of the Blind, held in St. Louis some time ago, suggested the idea of an attachment to a typesetting machine for perforating simultaneously a ribbon of paper with the same letters set up in type. These ribbons are then to be bound in book form, and by a transforming instrument passing over the perforations, the letters can be easily read by a blind person.

It is a better plan, he thinks, than raised letters, as the book leaves would take no more space than an ordinary printed book, while the expense would be trifling. As a rule, however, depressions are not as easily read by the blind as raised letters.

It would seem as if an attachment to a typesetting machine of this character could be easily invented and worked out. The idea of thus putting all the best literature into readable shape for the blind is certainly worthy of study by our brightest inventors and leading educators.

The Drinking of Water.

A physician in the Western Bottler states the necessity which exists for the presence of water in the diet and in the tissues of the body. The fact is well known, but the doctor writer has clearly given the reason for the beneficial action of water on the different organs. The article is of unusual interest and many persons will be the better from adopting its suggestions. Although water is not a food in the sense of directly contributing to the production of force or heat, it is yet a food in the sense that, without its presence in the body, all vital action must come to a standstill, as no change is possible in its absence. Our tissues contain an indispensable proportion of water; we are constantly losing large quantities by breathing, by perspiration and the various excretions, and, as just hinted, its presence is required for the occurrence of those various chemical changes by which we live and move and have our being. This being so, its value as an article of food may be taken as granted, and we may consider more particularly its action and uses when taken not as a food, but as a means to preserve health or to ward off or remove disease.

The effects produced by the drinking of water vary with the manner in which it is drunk. If, for instance, a pint of cold water be swallowed as a large draught, or if it be taken in two portions with a short interval between, certain definite effects follow—effects which differ from those which would have resulted from the same quantity taken by sipping.

EFFECTS OF SIPPING.

Sipping is a powerful stimulant to the circulation—a thing which ordinary drinking is not. During the act of sipping the action of the nerve which slows the beats of the heart is abolished, and as a consequence that organ contracts much more rapidly, the pulse beats more quickly and the circulation in various parts of the body is increased. In addition to this, we also find that the pressure under which the bile is secreted is raised by the sipping of fluids—a fact the importance of which we shall notice directly.

Many individuals may have been at times unpleasantly conscious of the fact that a glass of wine or beer sipped gets into the head much quicker than if drunk at a draught. They will now be in a position to understand why this is so; the explanation being that the temporary paralysis of the inhibitory nerve of the heart, and the increased stimulation of the circulation, favor the rapid absorption of the alcohol and the production of its consequent effects. The same thing occurs if the fluid be sucked through a straw, the effects of sipping and sucking being identical.

Swallowing in the usual way has not the stimulant effects of sipping, but it has one or two special effects not produced by sipping, the use of which we shall mention a little later.

EFFECTS OF DRINKING.

The effects of drinking cold water are these: If, say, a pint of cold water is swallowed straightaway, the temperature of the body is slightly lowered—about one degree Fahrenheit—the pulse rate is somewhat decreased (not greatly increased, as by sipping), and the respirations are slightly accelerated. The blood vessels in the lining membrane of the stomach are at first contracted; they very soon, however, rapidly dilate, the blood flow in them is increased, and the secretion of gastric juice is stimulated.

DRINKING WARM WATER.

There are, on the other hand, many persons who find that these effects are brought about better if they take warm water instead of cold, although at first sight it may appear somewhat strange that like effects are produced by both hot and cold water. The explanation is simple. The warm water acts exactly as does the cold, only without the previous contraction—its action being to at once dilate the vessels after its reception by the stomach. The practice of drinking

AT MEALS

large quantities of liquid is bad; but small quantities may be taken without harm, although undoubtedly it is wiser to drink either before or after the meal, if we cannot limit our consumption of fluids to a distinctly small amount. Whenever a meal is particularly rich in fatty material, it is a good plan to drink some time after the meal, as in this way the digestion of fat in the intestines is aided.

ITS PURGATIVE ACTION.

That water possesses a purgative action is a thing well known to many people. This particular effect is due to its power of stimulating the secretion of bile and also of increasing the peristaltic action of the intestines; bile being a natural purgative and increased peristalsis being the enemy of constipation and sluggish bowel action. If plain water be taken, its purgative effects are best produced by its being cold; if natural mineral waters are taken, they should be mixed with a small quantity of hot water so as to be at about the same temperature as the stomach. Warm water is more readily absorbed than cold, and moderate quantities than large ones, absorption being retarded if large quantities of either warm or cold water are taken at once. The best time to obtain the purgative effects of water is on rising in the morning. A glass of cold water taken on rising is often quite sufficient to procure an easy movement of the bowels, and this result will be the more certain if the water be sipped while dressing. This sipping operation should not, however, be hurried, but should be gone through slowly and at short intervals.

EFFECTS OF FREE DRINKING.

Free drinking of water produces effects upon the kidneys and tissues of the body generally no less important than those we have been considering. There is every reason to believe, from observations, the nature of which it is unnecessary for me to state, that the increased excretion of urine which follows the drinking of plenty of water not only clears the body of many poisonous and effete substances, but is itself an index of changes within the body which have for their end the enhanced health and comfort of the individual.

Much harmful material which has often to answer for malaise, want of energy, and various aches and pains, is undoubtedly washed out of the tissues and excreted by the kidneys as the result of free water drinking. This alone is decidedly beneficial, but, in addition, the drinking of much water causes the tissues to be changed, with the result that vitality is increased and strength augmented. So great in this direction are the effects of cold water, that persons leading sedentary lives may often obtain, by drinking plenty of water, much of the feeling of health and exhilaration which results from taking exercise—a fact not difficult of belief when we remember that a glass of cold water, slowly sipped, will produce greater acceleration of the pulse for a time than will a glass of wine or spirits taken at a draught. In this connection, too, it may not be out of place to mention the fact that sipping cold water will often

ALLAY THE CRAVING FOR ALCOHOL

in those who have been in the habit of taking too much of it, and who may be endeavoring to reform, the effect being probably due to the stimulant action of the sipping.

AN IMPORTANT DECISION.

A decision of much importance, owing to the magnitude of the interests affected and the questions of law involved, was handed down by the United States Circuit Court of Appeals for the Second Circuit on the 21st ult. in the suit brought by the Thomson-Houston Electric Company against the Hoosic Railway Company to restrain the infringement of letters patent No. 495,443, granted April 11, 1893, to the administrators of Charles J. Van Depoele for traveling contact for electric railways. This is the well-known trolley patent which its owners claimed covered every practicable form of under-running trolley, and the case was before the court on an appeal from an order of the Circuit Court granting a preliminary injunction against the defendant. The opinion, written by Judge Wallace, holds, upon the authority of Miller v. Manufacturing Company (151 U. S. 198), that the claims sued upon are invalid, because the same invention was patented by Mr. Van Depoele in patent No. 424,695, dated April 1, 1890, and the order of the Circuit Court granting the preliminary injunction was reversed.

Both of these patents originated in a single application filed by Van Depoele March 12, 1887. The application was subsequently divided, and patent No. 424,695, containing thirty-five claims, was issued on one of the divisional applications on April 1, 1890. The other divisional application was delayed in its progress through the Patent Office by an interference, and the patent in suit, containing sixteen claims, was issued thereon April 11, 1893.

The features covered by the claims in controversy are all shown in the accompanying drawing, which is identical in both patents.

In each patent there are shown a hinged trolley arm pivotally supported on a post on the car roof, the arm carrying the contact wheel and having at its lower end a spring with a suspended weight.

It will be observed that the construction, arrangement and necessary operation of the trolley, the trolley arm, the post on the car, the means of securing and supporting the arm on the post, the spring and weight, are exactly the same in both patents, not only in construction and arrangement, but in necessary operation.

The earlier patent purports to claim only a certain switch plate, switching devices, and certain details "which are not essential features of the contact device itself, considered without reference to the switch," and disclaimed the contact device which forms the subject of application No. 230,649.

If the claims of this earlier patent had been clearly limited to the details which were not "essential features of the contact device itself," or to the switch plate, the right of the inventor to claim broadly in his later patent the essential features of the contact device would have been unquestioned, but the claims were not all so limited. Among the claims of the earlier patent are the following among others that are not limited in the respects mentioned:

"15. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, a contact carrying arm pivotally supported on top of the car and provided at its outer end with a contact roller engaging the under side of the suspended conductor, and a weighted spring at or near the inner end of the arm for maintaining said upward contact, substantially as described. . . .

"32. In an electric railway, the combination, with an overhead conductor and a vehicle, of a trailing contact arm guided at its outer end by the overhead conductor, and movable laterally relatively to the vehicle, but having a normal centralizing tendency by means of a spring or weight.

"33. In an electric railway, the combination, with an overhead conductor and a vehicle, of an intermediate contact device consisting of an upwardly pressed trailing arm having a grooved contact wheel at its outer end by which it is guided by the conductor, the said arm being free to swing laterally relatively to the vehicle, but tending to remain in its normal central position by means of a spring or weight."

The presence of these claims in the earlier patent alone goes far to justify the decision of Judge Wallace.

The claims of the patent in suit of which infringement was charged were five in number, of which we give two examples, as follows:

"7. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, a swinging arm supported on top of the car, a contact device carried by one extremity of the arm and held thereby in contact with the under side of the electric conductor, and a tension device at or near the other end of the swinging arm for maintaining said upward contact, substantially as described.

"8. In an electric railway, the combination of a car, a conductor suspended above the line of travel of the car, an arm pivotally supported on top of the car and provided at its outer end with a contact engaging the under side of the suspended conductor, and a tension spring at or near the inner end of the arm for maintaining said upward pressure contact, substantially as described. . . .

"12. In an electric railway, the combination with a car of a post extending upward therefrom and carrying a suitable bearing, an arm or lever carrying at its outer end a suitable contact roller and pivotally supported in said bearing, and provided at its inner end with a tension spring for pressing the outer end of the lever carrying the contact wheel upward against a suitable suspended conductor, substantially as described."

After holding that the court should undertake to examine and "in a sense to review collaterally" the decision in the previous suit on the same patent, brought in the District of Connecticut, against the Winchester Avenue Railway Company, in which Judge Townsend, holding that the earlier patent did not claim the same invention, sustained the patent at final hearing, from which decision no appeal was taken, Judge Wallace says:

"The operative parts of the contact device are described in identical language in each patent, and the language of the claims aptly describes these parts. While the function of the tension device is stated with more particularity in the earlier patent, the description does not contain a word or hint by which its characteristics can be differentiated from those of the tension device of the later patent. . . . In the later patent, as well as in the earlier, the tension device is a spring and weight, so arranged as to 'permit lateral motion by the arm,' lateral motion being afforded because, as the specification of each patent states, 'the arm is hinged, and should, in most instances, be pivoted to the top of the post, although a reasonable amount of looseness in the hinged joint will answer the purpose of the pivot.' In the earlier as well as in the latter patent, the spring and weight 'are so arranged as to constantly tend to restore the arm to its normal central position,' and thus 'assist it to partake of the lateral movement of the car,' because this is the necessary action of the spring and weight at the short end of the arm. As described in each specification, the tension device is a spring, which is held in its proper place by the weight. . . .

"Of course, if the claims of the earlier patent do not specify such a tension device as is described and claimed in the later, but specify one which embodies only a subordinate improvement upon it, the patents are not for the same invention. . . . Inasmuch as the only tension device, or means for imparting upward pressure to a trolley arm, described in the specification of the later patent, is that which consists of the weight and spring as it is described in the earlier patent, the verbal differences in defining its functions in the several claims are of no significance. The thing itself is the same in the claims of both patents. The spring which tends to retain the arm in its normal position is exactly the same spring and no other than that which maintains upward