There are no doubt plenty of machines that will turn out these spokes at an average rate of one thousand per day, and which can be afforded for less than the cost of one man's labor for a single year. We are certain that machines are made which will turn out also from three to four hundred hubs of this timber per day. Indeed, the Kaufman *Star* informs us that a Northern firm offer to furnish spoke machines capable of making from twelve hundred to fifteen hundred spokes per day, for $250 each, and machines at the same price that shall make from four hundred to four hundred and fifty hubs per day, each requiring only one attendant, and the two doing more work than one hundred men could do without machinery.

It is easy to see how the introduction of such machinery into the region described would enable these hubs and spokes to be made for shipment to all parts of the country at a remunerative price, or even to be exported.

But Texas is not alone in the possession of timber treasures. Virginia, Georgia, North and South Carolina, and many other parts of the Southern States also can boast of very large tracts of valuable timber land, the most of which could be made to yield immense returns by the introduction of such machinery as has been for years employed in the timbered sections of the North. The cost of transportation after the raw material has been made into forms of increased value, is not materially more than for the shipment of the crude lumber, while it pays far better.

The manufacture of tubs, pails, chairs, sashes and blinds, and the great variety of wares which have made New England famous as a wood-working section, might, without doubt, be most advantageously carried on in the South, and our information of some few factories of this kind, which are now running in Southern localities is such as to greatly encourage the establishment of others.

PARAFFINE INDUSTRY.

In the Paris Exhibition of 1855 was shown a block of paraffine, with a few candles. Few visitors understood what it was, and no one could have anticipated the great extent to which the trade in this article would subsequently be pushed. The manufacture of paraffine candles has become an important industry, and there are single establishments in Germany capable of turning out 240,000 candles daily. In England and France the industry has reached vast proportions, and in this country it has no mean significance. Wagner estimates the production of paraffine in Prussia alone for the year 1870 at 11,000,000 pounds. The brown coal of Germany and the bog-head of Scotland and the Rangoon petroleum are particularly well adapted to the production of paraffine, while Bohemian and Austrian and other continental coals yield a very small quantity. The uses of paraffine are many. As its melting point is low it is proposed to employ it for the preservation of meat. Meat several times immersed in a bath of melted paraffine will keep for a long time, and when wanted it is only necessary to melt off the adhering wax-like coating to prepare it for cooking. For stoppers to acid bottles, to coat paper for photographic and other uses, as a lubricator, for candles, as burning oil, to coat pills, in the refinery of alcohol and spirits, paraffine now finds ready use. It has also been employed for the adulteration of chocolate and candies; for the preservation of railroad timber; to saturate filter paper for certain purposes; to coat the sides of vessels in which hydrofluoric acid was to be kept; to preserve fruit from decay; for oil baths of constant temperature; to prevent the oxidation of the protoxides; to render fabrics waterproof; as a substitute for wax in the manufacture of matches; as a disinfecting agent; as a varnish for leather, and for many other useful purposes. There are very few bodies that can attack or in any way decompose paraffine, and hence its great value in many chemical processes. Its use is likely to be further extended the more we become familiar with its properties, and it appears destined to assume an important position among our chemical industries.

CRAIK'S PRACTICAL AMERICAN MILLWRIGHT AND MILLER.

In our column of "New Books and Publications" will be found the notice of a book under the above title which deserves more than the ordinary notice; not that it has no deficiencies, or that it is characterized by scientific style and method, but that it embodies the results of a long and varied experience in the construction of various kinds of mills, an experience all the more valuable, as the author gives evidence in his pages that he is one of the comparatively rare individuals who can observe with discrimination, and draw accurate inferences. Perhaps no department of engineering demands greater fertility of resources than mill construction. Hardly any two mills are alike in circumstances of position, available power, and character of soil, upon which their foundations must be placed. Dams, also, require endless variety of detail according to the peculiarities of the beds of streams upon which they are erected. Varying heads of water, also, introduce further complications. In all of these particulars, and in many others, not specified, no amount of theoretical information can supply the lack of experimental knowledge; and next to such knowledge, personally acquired in practice, ranks that tersely and plainly communicated by such a man as the author of this work. The aim has not been to produce a scientific treatise. The work is rather an embodiment of practical results and tests of the various kinds of mill machinery under a wide range of circumstances, some of them "offering considerable difficulties and calling for great diversity of practice." The six chapters on water wheels are alone worth the price of the book. They however comprise only a comparatively small portion of the work, which is a large octavo, filled with practical information upon nearly every topic connected with the subject of mill building and running. The subjects of wind mills, their construction and adaptation to our Western prairie country, is of great interest, and is treated at length. The style of the work is such as any mechanic may understand, all algebraic formula being avoided, and the rules being simplified to the utmost.

Mr. Craik makes a statement in his discussion of the transmission of motive power, which is not correct. He says, "probably the greatest distance power was ever carried was by a combination of jointed rods used to connect a series of pumps with the water wheels which drove them, at the celebrated waterworks of Marli, near Paris, in France. Eighty-two of these pumps were placed more than three hundred feet above the power which drove them, and *half a mile away*." In Prof. Barnard's report upon the Paris Universal Exposition, on page 132, is an account of the successful transmission of power by Hirn's telodynamic cable, to a distance of nearly three and one eighth miles, at the mines of Falun, in Sweden. A short extract upon this subject, from the report alluded to, was published in our last issue.

But such an error as this is of little importance when compared to the great practical value of the work. In another part of the paper will be found an extract which is a fair sample of the plain, comprehensive character of the book, which we can confidently recommend to all who are interested in mill building and milling.

THE MILLENNIUM, OR SOMETHING LIKE IT.

We have, in another column, noticed the fact that the American Association for the Advancement of Science is forced occasionally to listen to papers containing nothing but twaddle, and that this twaddle, printed, redounds not to the honor of the Association at home or abroad.

Such, however, was not the character of the paper read by the well known scientist, thinker, and inventor of the "panatechner," Clinton Roosevelt, of this city. His paper discussed the question, "Ought a true science of national wealth to be excluded from the curriculum of the American Association for the Advancement of Science?"

If we may judge from the character of many of the papers read, the question as to whether anything should be excluded seems superfluous. But a superfluous question is often a splendid thing to string words upon, especially if in the stringing, the elegancies and accuracies of congruity, pertinence, terseness, perspicuity, and logic, are not considered essential.

To discuss the momentous question propounded by Mr. Roosevelt, was by no means a difficult task to one so rich in ideas, and so fertile and felicitous in diction. We were not present at the reading of his paper, but the report of it, published in the *Times*, gives evidence of its brilliant and exhaustive character. The assembled *savans* no doubt gave full expression to their delight when Mr. Roosevelt finished his paper. Being a polite set of men, they would not be likely to interrupt him by applause during the reading, however much the fullness of emotion might struggle for utterance.

Mr. Roosevelt was willing to allow, according to the motion of Professor Agassiz, made at the last annual meeting of the Association, at Salem., Mass., that the system of political economy, as taught in our colleges and universities, embracing only production, distribution, exchange, and consumption of articles having exchangeable values, is insufficient to embrace a true science of national wealth. In his view the science of national wealth consists of three orders and nine genera, without counting the species, varieties, etc.

Surely the *savans* cannot refuse to seize upon a subject involving three orders, nine genera, and an indefinite number of species. Such a field as this to enter in upon and take possession of! A veritable scientific Caanan, flowing with philosophic milk and speculative honey, and bearing choice fruits of endless discussion and debate! Surely, they each and all exclaimed in their hearts (being too polite to speak in meeting), "*Here's* richness! Here's *Richness!*"

According to Mr. Roosevelt, "the reason why all systems of government by reason alone, have failed hitherto to make peace on earth and good will to all, is that the will of man is not governed or to be governed by the greatest motives, but by the same general law that governs in physics; thus accepting the science of government as the science of motive powers. Motive powers are of two kinds, metaphysical and physical. And .whereas, in physics motive powers operate directly as the substance, and inversely as the squares of the distances in space, in metaphysics motives govern the will of man in times. Thus men who verily believe in eternal rewards and punishments still give way to the present temptations, and fear little practically, until death or the instrument of punishment comes near. Thus, as in the State of Wisconsin, the La Crosse and Milwaukee Railroad Company bribed all at once the Legislature, the Judiciary, and the Executive, and left the people as so many sheep without a shepherd; so has it always been."

As a specimen of much in little, we commend this passage as a model for very young students of English composition. Much words and little sense is a style that pays well in modern literature, as most contributors to our magazine literature are now paid by the column.

"The same things, which, if left alone, are destructive to life and happiness, if removed, become beneficial in their proper places; as the offal of cities left to find its own level in the lowest places, sends forth malaria, disease, and death, if transported to the surrounding country and covered in the soil produces flowers, fruits, and cereals for the support of life and happiness; that there is a law of Providence under the higher law of absolute necessity in the nature of things; that what a man or nation will not labor or fight to gain and guard when gained, shal' not be enjoyed."

This passage is copied verbatim from the *Times'* report. It doubtless means something, and if it were not too late, we would suggest that the Association should appoint a committee to ascertain the meaning, correct the grammar, and report at their next meeting whether it should be admitted into the curriculum of the Association, or not.

At the same time, Mr. Roosevelt's orders, genera, and species might also be distributed among the members—a priceless boon, since, according to that gifted thinker, they comprise "all that man can reasonably desire on earth, as useful or delightful to him"—a millennium, or something like it.

Mr. Roosevelt is especially hard on the free-traders, putting them into the same category with "free-lovers" and "free-booters." We don't see how they are going to stand this violent attack, which, following Mr. Greeley's *Tribune* essays on political economy, is, like charging, after a battle, upon the dead and wounded—to say the least—ungallant of Mr. R. He might, indeed he might, have let the free-traders alone, and confined his remarks to the physical and metaphysical motors which run railways and legislatures. How easy it would have been to have pilloried Prince Erie on his metaphysical motors, Fisk's Opera House, Camp Jay Gould, and an unlimited grab from the pockets of the Erie stockholders, not to mention Fisk himself, the most metaphysical motor on this continent.

But we reluctlantly leave Mr. Roosevelt's paper, from the reading of which we have become better, wiser, and more able to grapple with the hard problems of social science. When in due time the transactions of the American Association for the Advancement of Science shall appear, it will be demonstrated to the world that he who advanced it most, during the year 1870, was Clinton Roosevelt, Scientist, Thinker, and Inventor of the Panatechner.

THE ANALYSIS OF MILK.

Dr. Chandler, of Columbia College, has recently been paying attention to the analysis of milk in connection with an examination of the milk vended in this city. The results of his examination having been published, the method adopted for the analysis of milk in so far as its adulteration by water is concerned, has met with criticism from the pen of Dr. A. E. Davies, in the *Chemical News*. As the short article of Dr. Davies not only gives the method employed by Dr. Chandler to ascertain the amount of adulteration by water, and the reasons why it is considered defective, but adds a method considered much more exact, we copy the whole of it. The method is one that can be easily and generally applied, and will be found of use in the numerous cheese factories established during the past few years in this country.

Dr. Davies says:

"As to water being the only substance which is employed for adulterating milk, I perfectly agree with Dr. Chandler. Carbonate of soda and nitrate of potash are occasionally added, but only rarely, and in very small quantity. I have never met with chalk, sheep's brains, mucilage, sugar, etc., in any sample which I have analyzed.

"Since water, then, appears to be practically the only substance fraudulently added to milk, it is a matter of the greatest importance that we should be able to detect the presence of added water, and to estimate, at least approximately, its amount. This (at least the presence of added water) Dr. Chandler considers may be done by taking the specific gravity of the milk and estimating the water it contains by evaporating a weighed sample to dryness. 'Pure milk,' he says, 'varies in specific gravity from 1·023 to 1·032, water being represented by 1·000.' And, again, 'It is found that good milk generally has a specific gravity of from 1·029 to 1·032. In testing milk, the lower number is selected as a fair gravity for pure milk; and whenever the gravity falls much below this the milk may be considered as containing an excess of water, and consequently poor in quality or adulterated.'

"Now, according to my experiments, the specific gravity cannot be at all relied on as a test either of freedom from adulteration or of natural richness. I give a single example. A sample of milk of known genuineness recently analyzed by me gave the following results: Casein, 4·26; fat 6·26; sugar, 5·13; salts, 0·60; water, 83·75; cream (by the lactometer), 17 per cent; specific gravity, 1·0246. It was, therefore, a very excellent sample, and rich in all the solid constituents of milk, especially butter, but had it been judged by its specific gravity, it would have been put down as of very inferior quality. Besides, even supposing the specific gravity to be a reliable test of quality, it gives us no indication as to whether the milk is naturally poor or has been rendered so by the addition of water, and the test, in my opinion, is therefore worthless.

"As to the estimation of the amount of water by evaporation, Dr. Chandler says: 'A perfectly reliable method, though more laborious, is to actually determine the percentage of water in the milk, by evaporating a weighed quantity and carefully drying the residue at 212° Fah. If a milk loses more than 88 per cent of water, leaving less than 12 per cent of solids, it may safely be pronounced to be adulterated.'

"From this view, I totally dissent; the presence of 88 per cent of water is an indication of inferior quality, but is certainly no indication whatever that water has been purposely added. In milk of known purity, examined by Dr. Voelcker, as much as 90·70 per cent of water was found; and this alone shows the untrustworthiness of Dr. Chandler's test—at least, as far as it refers to added water.

"It appears to me, that what is wanted is, not a test which will simply tell us whether or not the milk contains more than the normal quantity of water, without giving any indication whether the water has or has not been added to the milk. If this were all, the estimation of the water, by evaporation, would accomplish it; but, what really is required, is a test which will show if the milk has been purposely diluted with water, and, if so, what quantity of water has been added. Such a test, I believe, we have in the specific gravity of the serum, or liquid portion of the milk, from which the casein and fat have been removed by coagulating and straining. The gravity of this liquid I have found to be remarkably constant, ranging, in that obtained from genuine milk, from 1·026 to 1·028; and, by carefully ascertaining the specific gravity of the serum of genuine milk diluted with various quantities of water, we may obtain a standard of comparison which will enable us to say, within a few per cents, what quantity of water has been added to any sample of milk that may come under our notice."

DIVISIBILITY OF MATTER AND SIZE OF CHEMICAL ATOMS.

Atoms as indivisible material elements of unchangeable form, size, and weight, are a convenient hypothesis conceivable in so far as the properties above enunciated are concerned. But any attempt to conceive of them as they really are is futile. Even if we could by improvements in optical instruments render them visible and demonstrate their existence by actual sight there would still be inconceivable things about these seen atoms, differing, as they would, from all other things that we can see, and from each other, not only in size and weight, but in qualities, of which we can have no conception, but which are inferred to exist from the chemical comportment of the elements to each other.

A correspondent has asked in what solution is the extremest division of matter apparent, and the nearest approximation to the size or bulk of the atom made. The first part of this query may be answered; the second is unanswerable, because the size of neither the atomic or molecular interstitial spaces are yet determined, so that if we could determine that a definite number of atoms were mingled with a given number of atoms of another kind we should still lack data for any estimate of their relative size. Assuming them to be spheres with their sides in absolute contact, such a calculation might be made, but all we know of the various states which matter assumes teaches that they do not touch each other.

To answer even the first part of the query would, however, require much research. We shall content ourselves with giving some remarkable instances of extreme divisibility. One three-hundred-and-sixty millionth of a grain of gold may be seen by the use of a microscope magnifying 500 diameters. A grain of copper dissolved in nitric acid will, upon addition of ammonia, give a blue tint to 392 cubic inches of water; one three-hundred-and-ninety-two millionth of which may be seen by the aid of a microscope. The ammonia contained in a small drop of water may be detected though only one part in two hundred thousand by the use of chloride of mercury.

Thompson, the celebrated physicist, has lately been performing a very interesting calculation with a view to determine approximately the size of atoms, the calculation being based upon the phenomenon of capillary attraction, the work performed in overcoming the contractile force of soap bubbles, the kinetic theory of gases (first suggested by Bernouilli, and since worked out by Herapath, Joule, Clausius, and Maxwell), together with the laws of optical dynamics. As the result of these calculations, he concludes that the diameter of gaseous molecules, or atoms of elementary gases, are not less than 0·0000000007942 of an inch. How much larger than this they may be, he does not tell us in numbers, but he does say that, if a drop of water should be magnified to the size of the earth, and each molecule magnified in the same proportion, the molecules would even then be smaller than cricket balls.

ENTERPRISING JOURNALISM.

The Atlantic Cable dispatch containing a full account of the great battle of Gravelotte sent to the New York *Tribune* and published in that paper on the 24th ult., is probably the longest and most costly dispatch ever sent over the trans-continental wires. It cost the *Tribune* $2,260 in gold. As a specimen of enterprising journalism this is absolutely unprecedented, but it may be surpassed ere the war closes. The slow moving dailies of London and other foreign cities will stand wide-mouthed with astonishment at the absolute disregard of expense shown by their American cotemporaries in obtaining news. We doubt whether any of them ever paid as much for news in an entire week as the *Tribune* paid for this single dispatch.

$20,000 BONUS FOR A NEW PRESS.

The circulation of the New York *Sun* has become so enormous that the publisher, Mr. I. W. England, finds it almost impossible to print the edition. Five presses are now employed for that purpose, but the utmost capacity of either is only equal to printing 17,000 copies per hour.

Mr. England wants a press that can strike off 40,000 copies per hour, printed on both sides, and he authorizes us to offer a bonus of $20,000 for such a press—one that will do its work well. This question of more rapid printing is one that must engage the earnest attention of our inventors, and it seems that the tendency of the *Sun* is in that direction.

THE School of Mines, of Columbia College, will re-open on Monday, Oct. 3. The announcement of Dean Chandler appears in our advertising columns.

SCIENTIFIC INTELLIGENCE.

FUORIDE OF SODIUM.

This valuable reagent can be made on a large scale by fusing 100 parts fluor spar, 140 parts of carbonate of lime, 200 parts of sulphate of soda, and an excess of carbon. The fluor spar is completely decomposed, all of the sulphur remains with the lime as sulphide of calcium, and the flux yields a colorless, pure solution.

The difficulty of obtaining a sufficient amount of material has prevented an extensive use of the fluoride of sodium, but now that it can be easily made it ought to attract more attention. It could be advantageously used for the resolution of many silicates, as it forms insoluble double salts with some of the sesquioxides, and in this way the soluble protoxides could be removed. Take, for example, the beryl, by treating it with fluoride of sodium, the aluminum would combine with the soda to form the insoluble double fluoride of aluminum and sodium (cryolite) while the glucina would be separated in an insoluble state.

Feldspar, treated in a similar way, would, no doubt, leave the potash in an available state, while the aluminum would form insoluble cryolite with the sodium. Fluoride of sodium would prove a valuable flux and reagent in the laboratory.

PLATINIZING GLASS.

R. Bottger recommends the following process: Pour rose mary oil upon the dry chloride of platinum in a porcelain dish, and knead it well until all parts are moistened; then rub this up with five times its weight of lavender oil, and leave the liquid a short time to clarify. The objects to be platinized are to be thinly coated with the above preparation and afterwards heated for a few minutes in a muffle or over a Bunsen burner.

This recipe is much simpler than the one given by us some time ago, and can be easily tried by any one. In order to recover the platinum from defective or broken glass, moisten with hydrochloric acid, and touch the spot with a zinc rod, when the platinum will fall off in thin leaves.

WRITING INK.

According to R. Bottger, a very good copying ink can be prepared as follows: Pulverize 30 grammes of extract of Campeachy wood and 8 grammes of crystallized carbonate of soda, and pour on 250 cubic centimeters of distilled water, and boil until the liquid has assumed a deep red color, and the extract is fully dissolved. Then remove the vessel from the fire, and add, with constant stirring, 30 grammes of glycercin of specific gravity of 1·25, and also 1 gramme of the yellow chromate of potash, previously dissolved in a little water, and 8 grammes of finely-pulverized gum-arabic, also previously moistened with water, and the ink will then be ready for use. This preparation will keep indefinitely in well-stoppered bottles, and there is nothing in it to attack the pens. Manuscripts can be copied by it without the aid of the press, by simply moistening the paper and using an iron knife or the thumb nail. The carbonate of soda prevents the gelatinizing of the ink, and the glycerin is a substitute for the sugar formerly employed.

TO DETECT THE AGE OF HANDWRITING.

Attempts have been made to invent a method for approximately determining the age of any writing. Iron inks suffer a change in process of time, and become yellow, the organic constituents disappear, and the iron becomes more prominent. By moistening the writing with weak hydrochloric acid (1 acid, 12 water) if the ink is old only a faint copy can be obtained, and the newer the writing the plainer will be the copy.

In experiments made by Carre, handwriting 30 years old gave scarcely any impression—an authentic document from the year 1787 yielded mere traces. Soaking the paper in weak hydrochloric acid gives opposite results, as handwriting a few months or a few years old is at once removed by the acid, while old ink has suffered such a chemical change that the acid no longer acts upon it. After the experiment it is well to neutralize the acid by suspending the paper over a capsule containing sal ammoniac. The test appears to be only applicable to writing several years old, and is confined to iron inks.

TO RENDER PAPER WATER-TIGHT.

The ammonia oxide of copper is a solvent for silk, paper, and cellulose. If its action be limited to a few moments it converts the surfaces into a gelatinous mass, and Scoffern proposes to employ this property to render the paper water-tight. If in the mill the endless sheet of paper is made to pass at a proper velocity through the ammonia copper solution, and is afterwards dried and pressed, the surfaces will be converted into a species of parchment, and will be water-tight. The rate of speed for the rollers must be a matter of experiment.

LIQUID GLUE.

Experience has shown that glue undergoes a chemical change when dried in the air, and its adhesive properties are decidedly deteriorated. To avoid this, says Prof. Wagner, in his report for 1869, some of the manufacturers have introduced a pure liquid glue in close packages, which is said to be superior to the dry article. It is prepared by digesting bones in a peculiarly constructed apparatus, and is sold according to a fixed specific gravity, so that the purchaser does not pay for the water, which in dry glue sometimes amounts to 12 per cent. The price is also less than for dry glue.

CEMENT FOR IRON AND STONE.

Glycerin and litharge stirred, to a paste, hardens rapidly, and makes a durable cement for iron upon iron, for two stone surfaces, and especially for fastening iron in stone. The cement is insoluble, and is not attacked by strong acids.

HIGHT AND WEIGHT.

[Condensed from Nature.]

One of the earliest efforts made to obtain anything like a fixed relation between hight and weight was that of Dr. Boyd, who weighed a certain number of inmates in Marylebone Workhouse. He took the hight and weight of 108 persons laboring under consumption, and found they measured 5 feet 7 inches, and weighed 90 pounds. He then measured and weighed 141 paupers who were not consumptive, and found that their average hight was 5 feet 3 inches, and that they weighed 134 pounds.

This subject attracted the attention of the late Dr. John Hutchinson, and he determined to take the hight and weight of all classes of persons in the community. In this way he collected the hight and weight of upwards of 5,000 persons. This list, however, included persons who exhibited themselves as giants and dwarfs, and other exceptional cases. He therefore reduced his instances to 2,650 persons, all of whom were men in the vigor and prime of life, and included sailors, firemen, policemen, soldiers, cricketers, draymen, gentlemen, paupers, and pugilists. This group of cases was intended to make one class as a set off against another, so as to get a fair average.

The following is the result of Dr. Hutchinson's observations:

Hight.		Weight.	Hight.		Weight.
Ft.	In.	lbs.	Ft.	In.	lbs.
5	1	120	5	7	148
5	2	126	5	8	155
5	3	133	5	9	162
5	4	139	5	10	169
5	5	142	5	11	174
5	6	145	6	0	178

Of course the result of these investigations of Dr. Hutchinson can only be considered as approximative, and he himself thought that a larger number of observations would lead to a more perfect law. The fact is, his observations are quite sufficient to establish all that we need, and to show that among a certain set of healthy men his estimate of weight and hight may be regarded as an approach to a healthy standard. It is only where considerable departures from the estimates given by Dr. Hutchinson take place that any particular case demands attention.

If the table is examined, it will be seen that the increase in weight for every inch of hight is a little more than five pounds. In fact, allowing for any error in observation, we may say that Dr. Hutchinson's table is reducible to the law that for every inch of stature beyond 5 feet 1 inch, or sixty-one inches, a healthy man increases five pounds for every inch in hight. If this deduction be accepted, we may very much simplify Dr. Hutchinson's table, and say that, as a rule, a man's weight increases at the rate of five pounds for every inch of hight, and this rule holds good for all practical purposes.

Although this law is approximately good for a certain number of cases, even above and below this table; it is practically found, and especially in the case of children and growing persons, that there is a wide difference of weight at hights below 5 feet.

Attention may also be drawn here to the fact that there will constantly occur in the community instances of persons where either the muscular or bony systems are excessively developed, and who consequently weigh more or less than their hight.

Dr. Chambers gives the hight and weight of certain celebrated prize-fighters, the result of Mr. Brent observations, which makes it very obvious that in certain cases the great weight depends on muscular and osseous development.

	Hight.		Weight.
			lbs.
Perrins	6	2	[illegible]
Caunt	6	2	[illegible]
Spring	5	11	[illegible]
Jackson	5	11	[illegible]
Bendigo	5	9	168
Johnson	5	8	187
Slack	5	8	192
Mendoza	5	7	172

The conclusion we come to with regard to these weighings and measurings is that all ordinary departures from the average hight and weight of the body deduced from Dr. Hutchinson's tables are due either to an increase or decrease of the fatty matter or of the adipose tissue in the body. Thus, taking the composition of a human body weighing 154 pounds, and measuring 5 feet 8 inches, it will be found that it contains 12 pounds of fat. It is then mainly due to the diminution or increase of this substance that human beings weigh more or less than the standard weights given in the above table. It will be therefore here worth while to inquire what is the use of fat in the system, and what indications are afforded by the hight and weight of the human body for caution in diet and regimen.

The exact way in which fat is produced in the tissue of plants and animals is not known, but there is evidence to show that it is found very generally in the tissues of plants and especially in the seeds. Oil when used for commercial purposes is mostly obtained from the seeds of plants, as seen in castor oil, rape oil, linseed oil, cocoa-nut oil, palm oil, and a hundred others. As it is found in the seeds of plants, so it is found in the eggs of animals. The embryo of all animals is developed in contact with oil, of which we have a familiar instance in the yelk of the egg of birds. It appears also that the muscular and other tissues grow under the fostering influence of the adipose tissue.

Besides this primary influence on the growth of the body, fat subserves many other purposes. In the first place it seems to be a reserve of material for producing muscular force when needed. Animals grow fat in summer, but as the supply of this material becomes scanty in winter