

creased. And we are not prepared to admit that this is not the best way to make this paper valuable to our correspondent and the class he represents, would they read it aright, regarding the information it offers as for them, and useful to them, not less than for bosses.

Still, in view of the melancholy fact that thousands have no faculty for turning information to advantage, and will not rise from the lower ranks of manual workers, it may be that the value of the SCIENTIFIC AMERICAN can be increased by trying to tell such readers how small incomes may be made to cover the essential requirements of satisfactory living. We shall undertake the task at a venture, though seriously doubting the value of even the wisest advice to one who has come to think, as our correspondent appears to, that an income of fifteen dollars a week is inadequate for decent living.

We have seen too many families living wholesomely, even generously, rearing children of fine character and liberal culture, on an income no larger than that which our correspondent complains of, to doubt for a moment the possibility of the same being done by him and by his shopmates. We know, by that most convincing of evidence, personal experience, that a large family can be reared, healthily fed, comfortably clad, fairly well educated, and well provided for every way, on very much less than fifteen dollars a week. Indeed, we hazard the assertion that if ten thousand of our best and most useful citizens, living and dead, be taken at random, an inquiry into their early history would prove that the great majority of them were reared in families in which an income of fifteen dollars a week would have been accounted munificent. But times have changed, it is replied, and with them the cost of living. True enough, though we are by no means sure that the necessary cost of living well is any greater than in times gone by. Go over the price list of the essentials of healthful and honorable living; and we are inclined to think that in the aggregate the cost will be found to be less, that is, will require fewer hours of labor to buy, than ever before. The fact that our style of living is vastly more complex and costly than it used to be, that a larger portion of what we are apt to consider necessities were inaccessible luxuries to our near ancestors, does not weaken the position we have taken in the least. One of the great social requirements of the present day is the recognition of our foolish extravagance and a readjustment of our modes of life to a more modest and more economical standard. There are even now thousands of families who have not lost the art of living wisely; and their daily experience proves that it is possible now, as never before, to reconcile humble earnings with high living, high, that is, in the truest sense of the word. Food, shelter, clothing, and all the other conditions of good living, such as our grandparents threw upon, can now be had for much less labor than they had to give for them; while the opportunities for educating a family, now within reach of the poorest laborer almost without cost, are such as former generations could not have had at any price.

To one that cannot accomplish all that our correspondent requires with the sum he mentions, barring, of course, severe misfortune, it is useless to give advice, certainly, without knowing precisely how he is situated, what his ideal of life may be, what his tastes and habits are, what sort of a wife he has, what house rent he has to pay, and some of the other conditions which go to determine the character and requirements of his home. Without the virtues of thrift, sobriety, and a hearty effort to make the most of what one has, neithertwelve dollars a week nor twelve dollars a day is any guarantee of wholesome and happy living.

Of some of the simpler means by which our correspondent and others like him may help to increase the purchase power of the money they earn, and to turn to the best advantage their slender incomes, we shall speak hereafter, not theoretically but practically, dwelling chiefly on what men have done and are doing to make a laborer's income provide the necessary and often many of the higher luxuries of life. The real question is, not how it is possible to support and educate a family on fifteen dollars a week or less, but how thousands are doing it.

**POISONOUS GARMENTS--A NEW HOT WEATHER PERIL.**

It has been a mooted question for a considerable period whether or not the pigments derived from aniline, itself a well known poison, are poisonous to the body when brought in close and continued contact therewith. German chemists assert the negative; but on the other hand, numerous cases of obvious poisoning have been so clearly traced to the wearing of garments dyed with aniline colors as to leave no doubt that, although poisoning by such substances may be a constitutional idiosyncrasy in individuals, still enough persons have suffered to render clothing thus colored to be avoided, at least in hot weather. And this for the reason that during the heated term, when perspiration is free, the pores of the skin are open, and the road for the absorption of this foreign deleterious matter is clear. Moreover, the perspiration may act as a solvent and at the same time as a vehicle for the poison; while in addition the system is necessarily enfeebled by the heat, and hence is not in a condition successfully to resist the noxious effects.

A recent case of poisoning by an aniline dye has been brought to our notice, and will serve to indicate the nature of the danger to which we allude. We may here remark that we have heard of repeated instances of poisoning due to coralline dye, a red pigment prepared from carbolic acid and allied to aniline; also to aniline red on cotton, notably colored undershirts and stockings having a red edge, and also to browns and yellows, in which dyestuffs picric acid may enter in its combinations. We have not hitherto heard

of, however, nor by examining authorities at hand have we been able to discover, an authenticated case of poisoning by aniline blue, other than that to which we now refer, and which has come under our immediate observation.

The garments were of a light woollen material, and, having become somewhat worn, were sent to an extensive dyeing and scouring establishment in this city to be dyed a dark blue. The owner, after wearing the clothes for a few days in hot weather, observed that the blue color stained his undergarments, and in the localities of the stains he became sensible of a cutaneous eruption. The latter soon extended on a large area, which became excessively inflamed; and a pustular state followed, resulting in excruciating suffering and prostration. The case was carefully examined by several eminent physicians in this city, who pronounced it one of the most severe attacks of poisoning that they had ever encountered, and unhesitatingly ascribed it to the dyeing of the fabric with aniline blue. Had the sufferer been a child or an invalid, the opinion was that the disease was sufficiently malignant to prove fatal.

Perhaps the safest rule is to watch all colored goods when worn, and promptly to discard the clothes on the first appearance of the dye's discoloring the garments or person, wherever it comes in contact.

**THE OBNOXIOUS POSTAL LAW PARTIALLY REPEALED.**

After an obstinate disagreement which has exhausted the ingenuity and patience of several conference committees, the two branches of Congress have at length agreed upon and passed a bill, which partially repeals the obnoxious postal regulation made during the closing hours of the last session. It was confidently expected that a measure which, since its enactment, has proved itself so excessively distasteful to all classes, which brought no benefit to the government service, but actually diminished receipts, and the effect of which was injurious to the public convenience, would have been immediately repealed. But the needed reform has been delayed until the closing days of the session, and is now but partially effected. The old rate of one cent for every two ounces or fractional part thereof, for all sorts of printed matter except unsealed circulars, is restored, while the present rate of one cent for each ounce is retained on unsealed circulars, on seeds and other merchandise. This is the principal change. It reduces rates on transient newspapers; but the merchant who desires to send a package of samples, or the seedsman a bundle of slips or cuttings, must still pay high charges. The measure seems to us to be ingeniously framed to satisfy the most of the people, and at the same time not to interfere with the profits of the express companies.

In addition to the above, several concessions, of not much intrinsic importance, but removing annoying and arbitrary restrictions, have been made. Postal cards, for instance, may have the address either written, printed, or affixed; any package may have the name and address of the sender, with the word "from" prefixed, on the wrapper; and the number and names of the articles in a package may be attached in a brief form to any such package.

Altogether the bill (which, as we have said, is a compromise between the Senate and House), if not what we hoped for, is an improvement over the law which it displaces. At one time an effort was made, but without success, to restore the obnoxious and expensive franking privilege, which existed so long, and was so abused by members of Congress.

**OPTICAL INVERSION--AN EXTERNAL SENSE--PERCEPTION.**

There are few phenomena in Science more complicated or which offer a wider latitude for differing opinions than those pertaining to vision; and it is a remarkable circumstance that the sense on which our perceptive faculties most closely depend should be the one least clearly comprehended. Helmholtz points out that our eyes are too opaque, that they lack symmetry, are wanting in achromatism, and in part are totally blind. By numerous simple devices it may be physically proved how defective are our powers of ocular estimation; and finally it is demonstrable by actual experiment that the images of objects which pass to the optic nerve are inverted, that in reality we see things upside down; and thus being led to doubt our sense, we are left in a kind of psychological fog, with all our preconceived notions of color, distance, and relative position sadly confused. In order to account for the fact that in actual life we do not see the sky below us and the earth above, or people heels upward, various hypotheses have been suggested. Of these the most commonly received, perhaps because the least definite, is that which ascribes the correspondence of our sight with the actual position of visible things to "experience." It boldly asserts that in fact we do see inverted people and things, but that our experience forbids the brain to recognize all objects as upside down, because it has made their inverted images the signs of their erect and true positions. Another theory is that the reversal of all images is due to the crossing of the filaments of the optic nerve: so that, for example, all the filaments from the upper part of the retina go to the lower part of the optic ganglia at the base of the brain, and vice versa.

To the first theory stand opposed the imperative testimony of every one's consciousness, and also the extended observations of Spalding and others on newly hatched chickens and new born pigs. The chicken just out of its shell, or one, after hatching, hooded for a day or two, and then allowed to see, will instantly locate an edible seed brought near it, seizing it accurately with its bill; and will also at once run in answer to the cluck of the hen, almost always in a direct line. Similar facts have been observed with pigs immediately after their birth. Thus in these animals the non-ne-

cessity of experience, even for the visual measurement of distances at short range, is proved.

We have before us a pamphlet entitled "On Some Disputed Points in Physiological Optics," by Professor Henry Hartshorne, in which, among other problems, that above referred to is dealt with in a clear and striking manner. Referring to the Spalding experiments, the author says that, while analogy here only affords a probability as to what is true with regard to human sight, the probability is nevertheless very strong: not that correct visual impressions in all respects are congenial with man, as observation of infants does not seem to show, but that at least the simpler elements of vision attend in their development the maturity of the eye as an organ, and that, among these elements, the sight of objects as not inverted must be one of the simplest. As regarding the hypothesis that the phenomenon may be due to hereditary transmission, he points out that experimentally acquired corrections of positive sensory impressions never go so far as to annul the perception which has to be corrected to such an extent that the process of correction cannot be ascertained by consciousness.

The second hypothesis, Professor Hartshorne disposes of by showing that it is not based on anatomical fact, that it is opposed to all the analogies of nerve distribution, and that according to it the image must be reversed horizontally as well as vertically.

The explanation which, our author states, is generally growing in favor with physiologists is that we do not mentally regard the image upon the retina at all, but look from the retina at the object. "The local change excited in the retina must be conveyed to the optic nerve, communicated to the brain and again in an inverted direction projected outward; through this double inversion, the projected image corresponds to the object, and we therefore say we see the object when only the projected retinal image is before the eyes." This of course leads us to the novel assumption of an externality belonging to and inherent in all our sense perceptions. Distance of sound is apprehended, even with only one ear open to receive it. Professor Hartshorne believes that it is obtained by the exquisite sensibility of the orifice of the ear and parts near it, a sensibility intermediate between auditory and tactile sense, "a kind of gradation existing here which, there is reason to think, has many illustrations in the partially differentiated sense organs of lower animals." So also we judge in case of touch, of the direction from which anything comes, a ball, for instance, striking the hand by reversing as it were the central axis of predominance of the impressions made, which is analogous to the ocular visual axes, whose correspondence gives us single object perception in sight. In fine, Professor Hartshorne thinks that our sensorial consciousness affirms the reality and externality of the objective world, no less simply, directly, and positively than our reflective consciousness affirms our subjective being.

**Waste Tobacco.**

Tobacco is boiled at the Richmond Cavendish Company's bonded works in Liverpool, to make a wash for sheep. As much as 28 cwt. has been boiled down on the premises in a single day, and on one occasion the Mersey river authorities were put to much perplexity and trouble by the difficulty of sinking a mass of refuse which had been sent out to sea, and persisted in floating back with the incoming tide. There were about 50 tons of it, and days passed before it could be induced to disappear. The decoction of tobacco is adulterated with sulphate of copper, turpentine, and salt, as soon as it is cool, and the exhausted leaf partially destroyed (denicotised) with quicklime before leaving the boiling house, under the direction of the customs. This prevents either the waste or the refuse from being used in tobacco manufacture afterwards. Each gallon of the sheep wash contains the essence of 24 ozs. of strong American leaf. The preparation, which is allowed to be sold free of duty, has found favor not only among breeders of sheep, but among agriculturalists and gardeners, as an effective vermin destroyer.—*John Dunning, in Journal of Applied Chemistry.*

**A Scientific Sermon.**

An English contemporary tells an amusing story of a well known scientific gentleman who, recently in a country town, gave a lecture on the cooperation of animals, taking as examples the bee, the beaver, and the buffalo. Among the deeply interested audience no one paid closer attention than an elderly clergyman, and none at the close of the discourse expressed greater gratification at the entertainment and instruction received. It was the scientist's fortune on the following Sunday to sit under the reverend gentleman's preaching. The good man, in his sermon, in turn grappled with the subject of the cooperation of animals; but judge of the horror of the previous lecturer when, in glowing fervor, the clergyman illustrated the wonderful works of Providence by representing the bee, the beaver, and the buffalo as all three working together in some foreign land in harmonious systematic combination!

**Recent Meteors.**

On the evening of July 8, a large meteor passed across the southern heavens, visible in Chicago and vicinity. On the evening of July 9, a large meteor was seen in the north, at New York and vicinity. It presented a beautiful appearance, being about four times the size of the planet Venus, with all the colors of the rainbow. It left a long and brilliant trail. A moment before it disappeared it broke into several pieces of a bright crimson and blue color. Several correspondents have informed us of this phenomenon, and are tendered our thanks for their letters.