

cessible by mutual effort to give and appreciate individually, what is known by the whole collectively; agreeing to observe such rules and regulations as may be adopted to accomplish the desired end. Improvement also is well defined by the same lexicographer as the act of making profitable use of anything, also a practical application of the doctrines and principles of a discourse or progress toward what is better.

Members of a Mutual Improvement Association, then, are to be the subjects of improvement, enjoying such facilities of intercourse as will operate favorably to enhance their usefulness; for all are alike mutually obligated to give and receive instruction, and all equally assume the responsibility to cherish advancement in knowledge of common things. Every member therefore should aim to secure knowledge for himself of what is known in the Association by strict attention to the rules thereof.

In order to succeed, make a beginning to acquire knowledge of first principles in as many branches of the arts as time, circumstances and the necessities of the case will admit. Can we read? If not, let us begin at once, and at the beginning of that important and fundamental branch of education make some progress, every day, and assure ourselves that we are learning to read, just so much, and that much well. Can we write? If not, let us practice the art of writing, and, for that purpose, avail ourselves of the valuable, though cheap, copies published, containing elementary or first principles, and although we may progress but little daily, let that progress be effectual. In connection with the above, let us learn to spell and institute such exercises in the art of spelling as would be, while very profitable, really entertaining pastimes in the family or social circles generally, at all suitable times. All of which departments harmonize to promote usefulness and attainment in any degree of excellence and efficiency.

In the further immediate pursuit of mental culture and gradual development comes, among the foremost, if not indeed the first, Grammar, which is the art of speaking and writing with propriety, or, as rendered by some grammarians, the art of speaking and writing correctly; others, again, have it, as the art of speaking and writing according to established usage (to which might be added) among the best speakers and writers. In the same connection comes Arithmetic, or the art of computation by figures, the ability to count from one or unity to an endless infinity; a never-ending source of progress and research; until, like the Great Supreme, we count the stars, their relative magnitudes and distances; or the infinitesimal sands upon the sea shore. With Mathematics and Algebra, to know and understand the signs and symbols which, without close application and research, are to us all a mystery and a myth. Also Geography, Chemistry, the analyses of all these or the science of reducing every organized theory or device into its component parts or elementary principles.

And, if we have no higher source of access to these attainments than through a mutual improvement association, let us prosecute our studies with the best books, make careful use of our spare moments, and avail ourselves of every facility for improvement; that we, the sons of Zion, may climb the Tree of Knowledge, the very leaves of which, are for the healing of the nations, and with eager grasp, pluck the fruit which hangs invitingly forth on every branch.

Fellow students, to accomplish this, we must press forward in the constant exercise of those mental qualities with which we are, every one of us, endowed in a greater or less degree. We may indeed pause, and while we pause, reflect upon the limits of the little steps by which we can reach the giddy heights of skill, honor, glory and renown, which appear in view, and realize that it is only by slow degrees, step by step, little by little. But, in the lapse of ages, these become the mighty whole, and thus the most enduring monuments of antiquity still appear as triumphs of immortal skill. To become familiar with which, we are led intuitively to the threshold of history, another department for the eager student, and there cull from the records of ages, the imperishable words which have immortalized the mighty dead of former ages. Solo-

mon said, "Get wisdom, get knowledge, but with all thy getting, get understanding."

We have faith in the opening up of boundless immensity as to treasures of knowledge by the revelations of God; and no better rule can I urge upon the attention of these classes than that of Paul the earnest apostle to the Gentiles, himself educated, brought up at the feet of Gamaliel, and which brings into full development the latent inspiration of all true and enduring progress on the march of improvement. Thus he addressed the earnest followers of Christ, seeking after truth: "Add to your faith, virtue, to virtue, knowledge, to knowledge temperance, to temperance patience, to these brotherly kindness, and to all of these, charity, which is, indeed, the greatest gift of all."

May the blessing of the Almighty crown your efforts and labors in mutual improvement, with abundant success, is the earnest prayer of Your fellow-laborer in the gospel,

WM. MORRISON.

WHEAT

Our health depends largely on the food we eat. Anything that relates to the hygienic influences of wheat, the prince of grains, is worth considering. The formation of its kernels, the character of its constituents, their action upon the various tissues of the human frame, and their correspondence to the constituents of the animal tissues, are well worth more than a passing notice.

The formation of any grain is interesting as showing its peculiar fitness to the needs of man. The protection its husk affords its inner treasure indicates the design and purpose. The fact that the oil within the husks protects the gluten, starch and salts from the influence of moisture, and keeps these constituents in a condition fit for food through long periods of time, is a strong demonstration of the Creator's goodness and persistent love for all the objects of his hand.

The husk envelope varies in its properties. In some wheat it is thin and smooth; in others thick and rough. In some it is dark, in others light; in some tough, and in others brittle. In some it is adherent to the kernel, in others it flakes off under the influence of the burrs or mill-stones. These varying circumstances vary the value of the different kinds of grain. The constituents of the grain, gluten, starch, oil and salts have a special position in its substance, still they are somewhat distributed throughout the mass. Directly below the husk is a layer of a darkish matter, harder than the more central parts, and thus not so easily reduced to powder. This is the gluten adhering to the husks, containing oil enclosed in minute cells. Within this crust of oil and gluten is the starch, more brittle in its texture, whiter in its color, more easily pulverized than the constituents encircling it. It is not pure starch, but it forms the whitest and finest flour. These several constituents are somewhat mingled in the body of the grain, and yet each exists in excess in certain parts already indicated. Such is the general anatomy of wheat and other grains. But we cannot pass a more minute description of so wonderful a gift of God to man. The outer coat or husk of grain consists of three layers of cells. Under these is a single layer of cells. Under this single layer is another layer containing gluten. These layers form the bran. Below them are layers of starch grains, filling the inner portion of the seed. An important point is that these layers are able to resist the pulverizing influence of grinding in various degrees. The bran is tough and fibrous, and so is least pulverized. The gluten, adhering to the bran, is more finely pulverized, while the brittle starch, the largest constituent of the grain, is most completely crushed and reduced to the finest dust. In this way the different constituents of grain are easily separated by using sieves of different degrees of fineness, forming four or more grades that vary not only in fineness, but in composition and nutritious and hygienic properties.

From what we have already said, the reader may infer that the quantity of bran in different kinds of wheat and other grains varies. The amount of gluten adhering to it de-

pends upon the mode of grinding or crushing.

The average percentage of bran is 15, and it is not waste, nor useless, as we may see from the following reliable analyses of six specimens of rye, namely: oil, 5; salts, 7; water, 13; nitrogen material, 19; husk and starch 55. Bran, then, is not a pure fibrous innutritious and indigestible material. This statement shows that oil, salt and nitrogenous, and so nutritious, matter is more abundant in bran than in starch, or the inner portion of the seed.

The constituents of all grains, though much the same in kind, vary in different varieties, depending upon the kind, the climate, the nature of the soil, the condition of the air in which they grow. We can only give an average per centage of these several constituents in the entire grain; namely: Bran, 2 per cent.; gum, 5; sugar, 8; water, 11; gluten, 12; starch, 62. Of these constituents the most nutritious and digestible is gluten, a nitrogen composite, or chemical combination, very largely concerned in forming all animal tissues. Gluten in different grains not only varies in its average amount, but in its qualities. In some wheat it is more tough and fibrous than in others. The exact condition of gluten in any grain depends upon the soil in which it grows, the moisture of the air and the drainage it may have received in harvesting. Many contingencies exist in raising any crop, but especially in grains, that may lessen the quantity, tenacity and strength of gluten. Its tenacity and strength may be found near enough for all practical purposes, by forming a paste with cold water and observing its adhesiveness or tenacity. Paste made from good flour will swell to four times its ordinary volume when the flour is dry; while the bad flour or that which contains but a small amount of gluten swells much less. Make a paste sufficient to quarter fill a tumbler. Observe its increase in volume. In fermenting, good flour suggests the peculiar smell of hot bread; while bad often yields an odor unpleasant to the sense of smell.

Vermicelli and macaroni are made from wheaten paste, that contains a large amount of gluten. So these articles of diet are nutritious in proportion to the percentage of gluten they contain. The wheat of warm climates contains more gluten than that of cold. Good macaroni should, then, be made from southern flour. If it be good, or contains a proper amount of gluten, after long boiling it should swell, should retain its given form and not fall to pieces nor run into a shapeless mass.

When the grains of wheat are first formed, their contents are milky. As they ripen, the water in the milk evaporates and leaves a hard mass or solid vegetable milk. If excessive heat of the sun occurs as the grains are ripening and hardening, they shrivel. And we may see that generally, the form, volume, and value of a wheat kernel depends upon its variety, the soil in which it grows, the temperature and moisture of the air in its early growth and especially in its ripening season.

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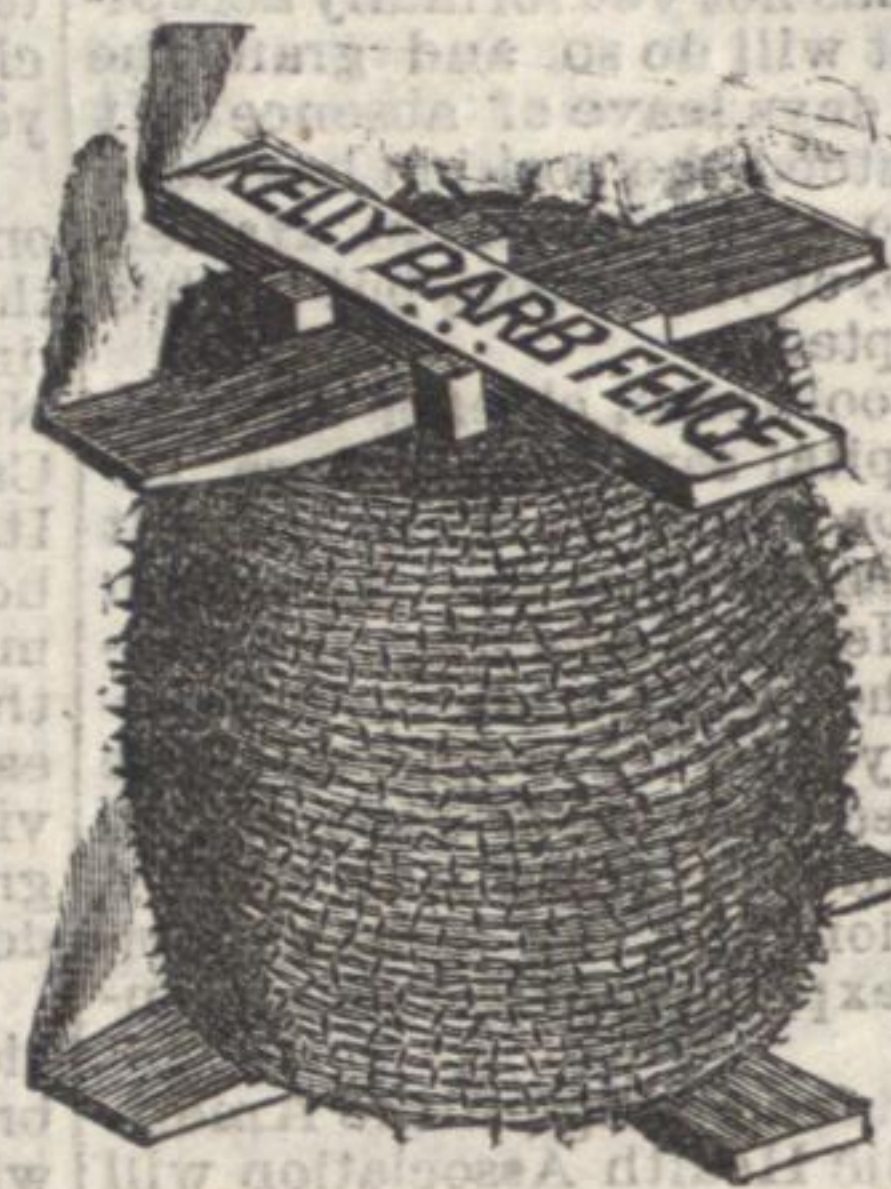
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