

AMATEUR MECHANICS.

SOME THINGS IN BURNISHED BRASS.

The old and commendable fashion of making ornamental objects from solid hand-wrought metal is being revived to a wonderful extent. Steel, iron, brass, and copper are wrought into a thousand beautiful and useful forms, and the gilded and tinsel objects of recent days are now set aside for substantial and elegant solid cast and hand-wrought ornaments. It will require only a suggestion to set the amateur mechanic at work at this sort of thing, when his dwelling will soon be adorned with articles that will be the more valuable for having been produced at home.

Brass tubing and rods of round hexagonal and octagonal section, plain and perforated strips of different widths and thicknesses, half round and semi-hexagonal strips, and brass buttons, knobs, and nails of various shapes, may be purchased, so that the amateur will readily find available materials for the kind of work suggested. Half-inch square tubes, strips of brass half an inch by one-sixth of an inch, a few brass buttons, and a few knobs, are required for the easel shown in Fig. 1. The tubes may be draw-filed, then finished with the different grades of emery paper with oil, or they may be polished on an emery wheel, and the final finish may be imparted by using the finest French emery paper with oil.

When two tubes cross each other they may be halved together precisely as in wood-work, and may be fastened by soldering with soft solder.

When the end of a tube abuts against the side of another tube it may be fastened solid enough for all practical purposes by soft soldering by means of a blowpipe. Of course the joint may be brazed or soldered with silver solder, but as great strength is not required it is unnecessary to take that amount of trouble.

A very good way of fastening is to solder a plug in the end of the tube that abuts against the side of another tube, and to put a screw laterally through one into the plug in the other. In this case it is well to leave a slight feather on opposite sides of the abutting tube to engage the corners of the tube to which it is attached.

The scrolls should be attached by means of small screws. The panels consist of thin pieces of board covered with velvet or plush of any suitable color.

They are inserted from the back, and are provided with a number of large convex nails. The support for the picture is movable up and down on the side pieces of the easel, and may be secured at any desired point by the milled screws.

The frame shown in Fig. 2 will require no special description. The main portion of it is made of square brass tubing. The side bars are made of round brass rods with turned end pieces, as shown. The mat of thin wood is covered with velvet or plush. The picture and glass are placed behind the mat; the latter is provided with small brass ears, which are fastened to the back of the frame by screws. The knobs at the top, bottom, and sides of the frame and easel are turned and attached with solder.

Fig. 3 shows a tripod stand for a nautilus shell, with an ornamental shell placed below it in the center of the plate,

forming the triangular base. Fig. 4 shows a clock case, consisting of an ordinary box of suitable size covered with plush or velvet, and inclosed in a frame of brass.

The frame is built up in the manner already described from square brass tubing split lengthwise through diagonally opposite corners. The lower portion of the frame consists of a wide band of brass, having a light bead soldered to its upper edge and a heavy bead soldered to its lower edge. A number of the brass nails are placed at regular intervals and soldered at the back of the brass base. The rail at the top is made of hexagonal brass tubing, and the small balusters are turned from brass rods. The palette and brushes are sawed from a plate of brass, and attached by

All of these articles may be lacquered, but they present a more elegant appearance if the metal is left unprotected and cleaned occasionally with rottenstone and oil.

There is hardly any limit to the number of elegant and useful articles that may be made of such materials, with the expenditure of little thought and labor. M.

NEW INVENTIONS.

Mr. Richard B. Ireland, of Trenton, N. J., has patented an improved switch signal. The object of this invention is to give notice of open or misplaced switches and drawbridges by an alarm on approaching engines, and thereby obtain security against accident additional to the usual signals. The improvement consists in the combination, with the switch-operating mechanism, of a turning dog located near the rails, and used in connection with a gong-operating lever on the engine.

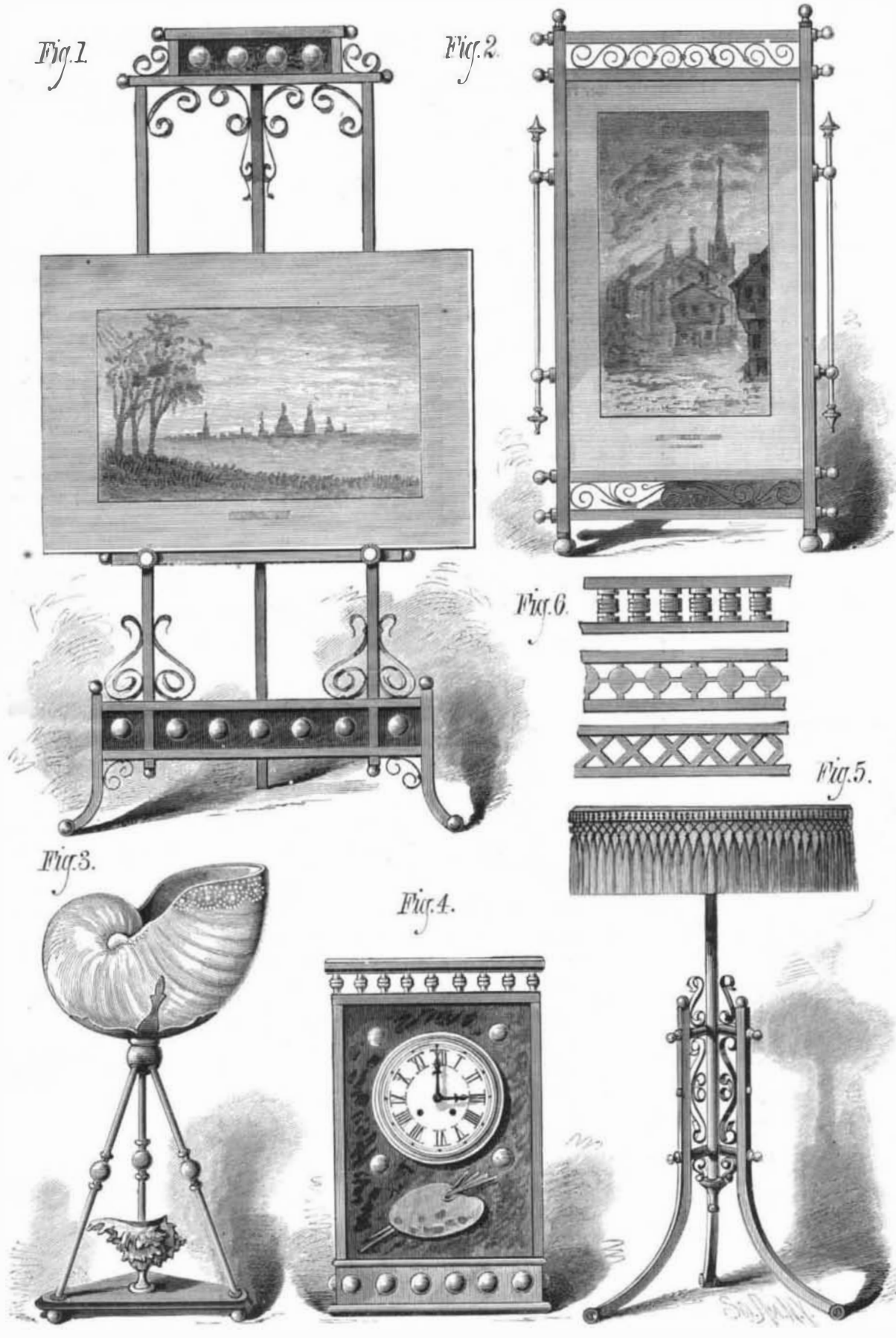
Mr. John A. Hudgens, of Pine Bluff, Ark., has patented an improved hub, having a tapering metallic axle box provided with a circular shoulder near its inner end, against which the inner hub collar abuts when the wheel is put together. The portion of the periphery of the axle box which receives the hub collars or flanges and spokes, is made polygonal in form, and the remaining outer portion of the axle box is made cylindrical and screw-threaded on its outer surface to receive the nut which holds all together.

Mr. Augustus P. Nance, of Batesville, Ark., has patented a cotton cultivator by which several rows or drills of cotton may be cultivated at a time, whereby unnecessary expense of time and labor may be saved. The invention consists in two parallel horizontal beams, supported upon two double runners arranged near their ends, and a series of knives and plows which are adjustably secured to the two beams. The beams for general use will be about forty-four inches in length, and are secured to the tops of the runners and connected with each other by clips. The runners are so constructed that they will rest upon the ground only at their forward and rear ends, the intervening space being occupied by the knives and plows.

An improved grain-cleaning machine has been patented by Mr. Baxter Wright, of Marshall, Minn. This invention relates to cer-

tain improvements in grain-cleaning devices of that type in which one or more inclined sieves are provided with a series of check boards, which, reaching nearly to the sieve, retard the passage of the grain and facilitate elimination of the cockle and small seed, by causing them to pass through the said sieve, while the clean grain passes out at the end of the screen.

A valuable improvement in electric lamps has been patented by Messrs. Edwin M. Fox and Ludwig K. Böhm, of New York city. This improvement relates to electric lamps in which vacuum chambers are employed, and its object is to facilitate the insertion and removal of the carbon, as well as the operation of drawing the vacuum, and to dispense with the usual operation of sealing the drawing nipple by melting. For these purposes the invention consists in the



ORNAMENTAL ARTICLES IN BURNISHED BRASS.

tacks soldered to the back. The patches of color are produced by different colors of sealing wax. Four brass nails are inserted around the dial to relieve the blank spaces on the plush. The clock and its plush-covered case may be removed from the brass frame when it is desired to clean the latter.

The table shown in Fig. 5 is of the same general character as the other articles, and will not, therefore, need particular description. The central portion is of three-quarter inch round brass tubing. The legs are of five-eighth square brass tubing. The top is of wood, plush-covered and fringed, and provided with a border of perforated brass.

Fig. 6 shows different kinds of panels. The balusters in the upper one are turned in the two lower ones; they are cut from sheet metal.

combination of a vacuum chamber formed with a neck and a sealing plug or stopper, having its longitudinal axis coincident with the longitudinal axis of the neck, and bearing the conducting wires; both the stopper and the neck being formed with openings arranged to be turned into or out of registration to permit the lamp to be first exhausted and then sealed.

Mr. James F. King, of Aubrey, Kan., has patented an improved cultivator shovel. In this improvement, the point of the shovel is securely held in position by causing it to form a beveled joint with the lower end of the upper plate, and backing the latter and the point, by a supporting plate riveted to the upper plate and bolted to the point, and the whole secured to the standard of the plow by a bolt passing through both plates. This forms a very strong construction of the shovel, and provides alike for the ready substitution of a new plow point when necessary, and for the replacement of either of the plates, or removal of the whole from the standard.

An improved water-indicating gauge cock device, which serves to indicate with greater accuracy the depth of water in the boiler, regardless of any deviation from a horizontal position of the boiler, has been patented by Mr. Joseph B. Snyder, of Montpelier, Ohio. The invention consists in a combination with a boiler, having a plate arranged to separate the water from the steam space of the boiler and provided with upwardly projecting steam distributing tubes, of a series of water gauges attached to pipes placed above and below said plate and extending about half way into the boiler.

Mr. George A. Deitz, of Denver, Col., has patented an improved method of preserving grapes, which consists in packing or embedding them in carbonized wheat bran or hulls, which substance has a disinfecting quality and tends to exclude the air and prevents its circulation, as well as maintains a comparatively even temperature. Grapes thus packed will be preserved a longer time and in better condition than when packed in other fine material commonly employed heretofore—such, for example, as sawdust, uncarbonized bran, fine cut paper, and kiln dried meal.

Mr. David W. Lloyd, of Pittsburg, Pa., has patented an improved metal lathing and furring. The invention relates to metal lathing and furring to be applied to ceilings or walls having iron girders for the purpose of holding the plaster, to which girders wooden laths cannot be applied, or to which it may not be desirable to apply wood on account of fire risks. The invention consists of metal furring strips applied transversely to the girders and having dovetail notches in their edges, with which are combined laths made of sheet metal bent into a dovetail shape in transverse section, said laths being slipped endwise into the notches in the edges of the furring, and being firmly held in a transverse relation therein, without nails or other special fastenings. This forms a very simple and secure construction and provides for the proper retention of the plastering.

An improved axle lubricator has been patented by Mr. Isaac N. Snedecor, of Gainesville, Ala. This invention relates to axle lubricators for railway cars in which the oil is conveyed from a reservoir beneath the axle to one above it by means of a suitable rotating device attached to the end of the axle. Therefore, in lubricators of this description, a slight longitudinal oscillation of the axle has been sufficient to strain or displace the rotating device, and the supply of oil has usually been more copious than necessary. The present improvement obviates these defects, besides being otherwise advantageous. It consists in a brush wheel fitted on a pin in the end of the axle so as to rotate with it, and held up against the end of the axle by a spring, but capable of movement along the pin. The brushes on this wheel strike a pin in the upper reservoir to discharge the oil, and a diagonally grooved box distributes it over the bearing.

Mr. Albert C. Ellithorpe, of Chicago, Ill., has patented a very efficient safety device for elevators. The invention generally consists in a combination, with an elevator car provided with a brake mechanism, of an auxiliary air shaft, a cage moving up and down within said shaft and provided with an upper and lower valve operated by the resistance of air in the shaft, and a connection between the cage and elevator car adapted to be broken or detached by the resistance of the air when an accelerated speed is imparted to the car either from breakage of the lifting rope or other cause. In the event of the elevator car moving with too great velocity downward, a corresponding increase of velocity is imparted to the cage upward, and the resistance of the air in the shaft causes the valves in the cage to prevent air contained in the upper closed portion of the shaft from passing the cage, thereby producing a strain on the cage which breaks its cable and causes the brakes on the car to be applied. A valve at the bottom of the shaft, opening upward, admits air to prevent a vacuum when the cage is moving upward, and assists in establishing an air cushion when the cage descends too rapidly.

Mr. Peter D. Graham, of Black Hawk, Col., has patented a combined calipers, rule, and beam compass. In this invention the calipers are formed with an arm extending backward from the joint which unites their legs. The outer end of this arm is formed or provided with a pointed extension which may be used as one of the legs of a beam compass by screwing the extension arm of the calipers on to a screw-threaded reduced portion of the end of a measuring rule, a sliding scriber or leg with caliper attachment being fitted for adjustment on the rule to complete the beam compass. By removing the calipers from the rule, then they and the rule

may be used separately, and the pointed extension of the calipers' arm, when made detachable, may be used as a scratch awl. This makes a convenient combination of several instruments used in the same trade.

Mr. Henry H. Thorp, of New York city, has patented a valuable improvement in types for curved or sloping-line work. In ordinary types the letters are formed on bodies of irregular widths bearing no special proportions to each other; hence, when set up in curved or sloping lines they cannot be justified with the ordinary quads that are used in straight-line work, accordingly the work of setting types of the ordinary construction in curved or sloping lines is very tedious. The object of this invention is to produce, with types in position, curved and serpentine lines by casting the faces of some of the types in different positions on the type bodies and the types of runningwise widths that are multiples in one way and fractions in another of certain units. The invention consists in forming the type bodies according to their faces or letters of runningwise widths that are multiples of a measure of which the width of the body having the narrowest letter represents the unit, the wider type bodies being cast or formed of runningwise widths increasing regularly in eighths, quarters, or other regular multiples of the unit, these widths of the type bodies being also fractions of their bodywise heights.

The Origin of the Guillotine.

The *Journal* has frequently called attention to the SCIENTIFIC AMERICAN, not only as a paper specially devoted to science, but as a weekly newspaper that abounds in what may be styled the cream of interesting general news.

In the SCIENTIFIC AMERICAN of November 5 the following item is published:

"A MÆDÆVAL GUILLOTINE.

"The Chapel Bridge, at Lucerne, contains a mediæval painting representing the persecution of the Helvetian Christians under the pagan emperors of Rome. On the right side of the picture a number of Christians are being hurled into a river, perhaps the Reuss. On the left side a very evident guillotine is erected; one Christian lies with his head on the block, and the huge iron is just about to be let drop upon him, while a number of headless bodies lie around with the heads close beside them. It is commonly believed that this decapitating machine was the invention of Dr. Guillotin, a French physician, and member of the National Assembly of 1789. The Lucerne painting was made at a much earlier date."

According to Gibbon, the most severe persecution of the Christians occurred toward the close of the reign of Diocletian, who reigned twenty years, and resigned on 1st May, A.D. 305.

The painting at Lucerne probably refers to the persecutions of this period, when many of the Christians were beheaded; and this would, therefore, appear to be the earliest indication of the guillotine.

In Camden's "Britannia," translated by Edmund Gibson, and published in 1695, a large folio of over 1,200 pages, written by Camden nearly three hundred years ago, and devoted by him to what was then the antiquities of England, on pages 726 and 727, the following interesting description of the guillotine will be found, under the account of Halifax:

"But nothing is more remarkable than their methods of proceeding against Felons; which, in short, was this: That if a Felon was taken within the Liberty with Goods stolen out of the Liberties or Precincts of the Forest of *Hardwick*, he should, after their Markets or Meeting days within the town of *Halifax*, next after his apprehension, be taken to the Gibbet there, and have his head cut off from his body. But then the fact must be certain; for he must either be taken *handhabend*, i. e., having his hand in, or being in the very act of stealing; or *backberend*, i. e., having the thing stolen either upon his back, or somewhere about him, without giving any probable account how he came by it; or lastly, *confessor*, owning that he stole the thing for which he was accused.

"The cause, therefore, must be only theft, and that manner of theft only which is called *furtum manifestum*, grounded upon some of the foresaid evidences. The value of the thing stolen must likewise amount to above 13 *sh. ob.* for if the value was found only so much, and no more, by this Custom he should not dye for it.

"He was first brought before the Bailiff of Halifax, who presently summoned the Frithborgers, within several Towns of the Forest; and being found guilty, within a week, was brought to the Scaffold. The Ax was drawn up by a pulley, and fastened with a pin to the side of the Scaffold. If it was an horse, an ox, or any other creature, that was stolen; it was brought along with him to the place of execution, and fastened to the cord by a pin that stay'd the block. So that when the time of execution came (which was known by the Jurors holding up one of their hands) the Bailiff or his Servant whipping the beast, the pin was plucked out, and execution done. But if it was not done by a beast, then the Bailiff or his Servant cut the rope.

"But the manner of execution will be better apprehended by the following draught of it."

Immediately following there is shown on page 727 a picture which is in itself a curiosity, showing:

"A. A. The Scaffold.

"B. The piece of wood wherein the Axe is fixed.

"C. The Axe.

"D. The Pully by which the Axe is drawn up.

"E. The Malefactor who lyes to be beheaded.

"F. The pin to which the Rope is ty'd that draws up the Axe."

The foregoing extracts are copied by word, by letter, and punctuation, according to the text, by which it will be noted that the important nouns are spelled with a capital letter; that Ax is spelled both with and without an e at the end; that the word horse has an prefixed; that die is spelled *dye*, and *d* for *e*, etc.

The title of this imposing and interesting work is "Camden's Britannia, newly translated into English, with large additions and improvements, published by Edmund Gibson, of Queen's College, in Oxford, and this description of the guillotine is one of the "additions" by the translator. The original work was first published in Latin about the year 1586. In twenty years this important work went through six editions, the result of twenty years of personal research in almost every county in England. The translation by Gibson was published in 1595.—*Bucyrus* (O.) *Journal*.

The Duration of Life.

From a paper read before the Investigators and Physicians, at their Salzburg meeting, by Weismann, the *Chemiker Zeitung* makes the following extracts:

In the first half of his address the speaker endeavored to show that the very great difference in the duration of animal life did not depend solely upon the anatomical and physiological proportions of their bodies (size, complicate structure, early maturity, etc.), but that it depended far more upon the exact accommodation to its conditions of life in the different species, and that in the course of the formation of new species corresponding to changes in the conditions of life it may be lengthened or shortened.

The second half of the paper discussed the manner in which we may suppose such an accommodation to the conditions to exist.

If we inquire what are the mechanical changes which may cause a lengthening or a shortening of the duration of life, it will lead us to one of the most difficult of all physiological problems, namely, what is the reason of death taking place—why must an animal die?

It is well established that in the higher animals the vital processes are combined with a change in the morphological elements of most of the tissues, and it is but natural to seek for a cause of death in a limit to the multiplying power of the cells, which does not, of course, exclude the idea that death may occur much sooner too.

Upon this hypothesis it would follow that there is a certain normal number of cell generations for each species (although varied within wide limits), and that the maximum length of life is governed by this. We do not comprehend why one cell must divide or segment itself ten times, a thousand times, or a hundred thousand times, and then the process should cease. This subdivision and segmentation, from a physiological standpoint, could continue for ever.

It is only by considering it from the utilitarian standpoint, upon the ground of expediency, that we can understand the necessity of death, and the same ground favors the utmost shortening of life. The individual by contact with the outer world around becomes worn and used up, so that it would be indispensable that it be replaced by new and more perfect ones, even if it contained within itself the power of living on for ever.

It does not, however, follow from the expediency of death that internal causes, lying in the very nature of life itself, should be excluded, as, for example, the floating of ice on water is expedient (answering a purpose), but at the same time depends upon its molecular structure.

Still Weismann does not believe that a definite limit has been set upon life simply because it, from its very nature, could not be endless, but that it is limited because the unlimited duration of the individual would be an inexpedient luxury, and he considers death to be a phenomenon of accommodation. The power of living for ever has been lost because it was no longer necessary.

Death is not an attribute that belongs to all organisms; there are many of the lower organisms which, although they can be destroyed, are not compelled to die. In the division of the amœbæ we cannot call it death, for where is the corpse? Let us suppose an amœba to possess consciousness; it would then on dividing say to itself: "I have cut off from myself a daughter." I do not doubt that each half would think that the other half was the daughter, and would look upon itself as the original individual.

If, then, death is necessary for the higher animals, why not for the lower? Are they not decimated by their enemies? Do they suffer no defects? Do they not wear out? In the lower organisms there is but one alternative: complete integrity or total destruction; they cannot suffer a normal death because the individual is identical with the propagating cell. In the multicellular organisms there are different kinds of cells, so that death is possible, and we see that it follows.

The kind and quantity of propagation does not depend merely upon the nutrition of the cells, but also upon their specific nature, as seen most distinctly in the phenomenon of inheritance, and it is a necessary sequence of this view, if we look upon death as foreordained, because it is the inherited end of that segmentation process whose beginning was the sulcation. (Cells multiply by subdivision, but before this takes place they become furrowed, or *sulcated*, at the point where division subsequently takes place.)

C. Z.