DEBRIS.

of oil a series in the best of the

After the house is finished, the debris often contains a few choice brick and some stone that did not seem to exactly fit in anywhere. There is a barrel or so of good mortar, half a load of sand, a little nice lumber, a bunch and a half of shingles, and one of lath. There are remnants of nails and screws, paint, oil, putty, glass, and wall-paper. Some of these are as good as any employed in constructing the building. The most worthless fragments are carted away and covered up or burned.

So in writing a lecture, a story, or a book, there will often be more or less surplus materials. A change in the plan, perhaps, will make it seem best to leave out some things for want of a suitable place to use them.

I once supposed the following quotations among many other things would certainly find a place in the former pages, either as headings to chapter or paragraph or in some other place. A few were thus used, but most were left over. Here are some of the remnants:

- "Go to grass."
- "All flesh is grass."—Isaiah.
- "The staff of life."—Said of wheat,
- "Let the earth bring forth grass."—Leviticus.
- "Sweet fields arrayed in living green."
- "Grass is rather a good savings bank."—Joseph Harris.
- "Grass is the pivotal crop of American agriculture."—Geo. Geddes.
- "Grass is king among the crops of the earth."-Alex. Hyde.
- "The grasses are the foundation of all agriculture."
- "He maketh me to lie down in green pastures."—23d Psalm.
- "A water meadow is the triumph of agricultural art."—Pusey in Jour. Roy. Ag. Soc., 1849.

"Farmers pay too little attention to their pastures."-N. H. Agrl. Rept.

"The cheapest manure a farmer can use is clover seed."—American Proverb.

"No grass, no cattle; no cattle, no manure; no manure, no crops."— Belgian Proverb.

> "Then learn to toil and gaily sing, All flesh is grass, and grass is king."

> > -Missouri Agrl. Rept.

"The term grass is only another name for beef, mutton, bread and clothing."

"Feed your land before it is hungry; rest it before it is weary; weed it before it is foul."—English Farmer.

"One year's seeding
Is seven years' weeding."

"He who makes two blades of grass grow where only one grew before, is a great public benefactor."—Dean Swift, in about 1720.

"And the ripe harvest of new-mown hay Gives it a sweet and wholesome odor."

-Colley Cibber.

"The melancholy days are come, the saddest of the year,

Of wailing winds, and naked woods, and meadows brown and sear."

-Bryant.

"Plants do not grow where they like best, but where other plants will let them."—Dean Herbert.

"How doth the little busy bee Improve each shining hour, By carrying pollen day by day To fertilize each flower."

"And he gave it for his opinion that whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together."—Gulliver's Travels.

"But of all sorts of vegetation, the grasses seem to be most neglected; neither the farmer nor the grazier seem to distinguish the annual from the perennial, the hardy from the tender, nor the succulent and nutritive from the dry and juiceless. The study of grasses would be of great consequence to a northerly and grazing kingdom."—White's Nat. His. of Selbourne.

BIBLIOGRAPHY.

No attempt has been made to render this list of authors complete, yet it contains the leading authorities which have rurnished the greatest help in preparing this volume.

Agricultural Gazette (English), 1880.

Agricul. Reports, U. S., for 1879, '80, '81, '82, '83, '84.

Am. Agriculturist. Short notes, 1870 and later.

Am. Jour. Sci. Numerous short articles and notes.

The American Naturalist, several volumes, Phila,

Trans. Lin. Soc. The Morphology of the Flowers of Grasses, by Geo. Bentham. Hand-book of the British Flora.

Bentham and Hooker. Genera Plantarum, vol, 3, Berlin.

Dr. C. E. Bessey. Botany for schools and colleges, N. Y.

Botanical Gazette, Ind. Numerous notes.

Robert Brown's Miscellaneous Botanical Works, 2 vols. Ray. Soc., London.

Robert Brown. Compt. Manual of Botany. Edin. and London.

Prof. James Buckman. Prize Essay. Jour. Roy. Agrl. Soc., 1854.

Bulletin of the Torrey Bot. Club, N. Y.

William Carruthers, Consulting Botanist, Jour. Roy. Agrl. Soc. His annual reports for some years.

Carter on Laying Down Land to Grass. A pamphlet. Eng.

A. W. Cheever, in N. H. Agrl. Report, 1875.

The Clover Leaf, 1880, '81, '82, '83, '84. Birdsell Mnfg. Co., South Bend, Ind.

Rept. Conn. Board of Agrl., 1868 and later. Numerous valuable notes. The Country Gentleman. Many good articles, from 1870 to 1886.

C. Darwin. Cross and Self-fertilization of Plants, and Power of Movements in Plants.

P. Duchartre. Elements de Botanique. Paris.

M. J. Duval-Jouve. Histotaxie des Feuilles des Graminees, in Annales des Sciences Naturelles. Paris.

Encyclopædia Britannica. Article on Grasses, by H. T.

Morgan Evans. Jour. Roy. Agrl. Soc., 1876.

Prof. C. H. Fernald. The Grasses of Maine.

C. L. Flint. Grasses and Forage Plants. Boston.

The Garden. Vols. 4 and 8, Ornamental Grasses; vol. 8, Wild Grasses for Bouquets. London.

Gardener's Chronicle. Fertilization of the Flowers. March, 1874, Feb., 1875.

Botanical Text-Book. A. Gray and G. L. Goodale.

Manual of Botany. A. Gray.

Wm. Gorrie. Articles in Morton's Cyclo. of Agrl.

Prof. J. Stanton Gould. Grasses and their Culture. N. Y. Agrl. Rept., 1869.

Prof. J. S. Gould. Lecture on Grasses. Maine Agrl. Rept., 1872.

E. Hackel. Monographia Festucarum Europæarum.

Joseph Harris. Value of an Analysis of Grasses. N. Y. Agrl. Rept., 1865.

J. Henderson. Hand-book of the Grasses. New York.

A. Henfrey. An Element. Course of Bot. London.

J. D. Hooker. The Student's Flora of the British Islands.

Rev. C. W. Howard, of S. C. A Manual of the Cultivation of the Grasses and Forage Plants.

James Hunter, a pamphlet, Eng. Permanent Pasture Grasses.

Alex. Hyde. Twelve lectures on agriculture before the Lowell Institute, Boston.

Indiana Farmer.

Jour. Roy. Agrl. Soc. of Eng. Many valuable papers in many volumes, notably for 1854, '56, '58, '59, '60, '61, '66, '69, '72, '74, '75, '76, '77, '82.

J. B. Killebrew. The Grasses and Forage Plants of Tenn.

I. A. Lapham in Wis. Agrl. Rept., p. 409, 1853.

Lawes and Gilbert. Philosoph. Transactions. London.

Lawes and Gilbert. Treatment of Pastures. Jour. Roy. Agrl. Soc., 1858, 1859.

Dr. J. Lindley. The Vegetable Kingdom.

J. Lindley. Many articles in Norton's Cyclopedia of Agricul.

The Treasury of Botany. Lindley and Moore.

E. J. Lowe. British Grasses.

Maine Agrl. Rept. Discussions and notes, 1870, "71, "72, "76, '81.

Maout and Decaisne. Translated by Hooker. Descrip. and Analyt. Bot.

Dr. Maxwell T. Masters. Plant Life on the Farm. London.

Dr. L. D. Morse, in Missouri Agrl. Rept., p. 211, 1868.

Michigan Board of Agriculture, 1871, '75, '77, '78, '80, '81, '82, '85. Reports and lectures by W. J. Beal.

Crops of the Farm, by J. C. Morton and others, London.

The Fertilization of Flowers, Prof. Hermann Müller.

Nat. Live Stock Jour., 1872, '73, '81.

N. H. Agrl. Value of Quack Grass. p. 142, 1853.

Prof. J. R. Page, University of Virginia. Report for 1879-80.

Penn. Agrl. Rept., 1881.

Dr. D. L. Phares, of Miss. The Farmer's Book of Grasses and other Forage Plants.

M. Plues. British Grasses.

The Prairie Farmer, 1869 and later.

Prantl and Vines. Text-book of Botany. Phila.

The Press, Phila. Pa., 1884 and later.

Proceedings of the Association for the Advancement of Science. Articles by W. J. Beal.

Proceedings of the Soc. for the Promotion of Agrl. Sci., vols. 1, 2, 3. Contributions by W. J. Beal.

The Rural New Yorker, 34 Park Row, New York. Many articles by able writers, especially for July, 1885.

A Text-book of Botany. J. Sachs.

James Sanderson. Grass with or without a Crop. Trans. of Highland Soc., 1863.

Prof. N. S. Shaler. Science, p. 186. March, 1883.

G. Sinclair's Hortus Gramineus Moburnensis, 1826, London.

Sowerby and Johnson. The Grasses of Great Britain.

Prof. L. Stockbridge. Management of Pastures. Maine Agrl. Rept., 1876, '81.

Sutton & Sons, Eng. Permanent Pastures. A pamphlet.

J. J. Thomas. Prize Essay. N. Y. Agrl. Rept., 1843.

Dr. Geo. Thurber. Geolog. Sur. Cal. Botany, vol. 2.

The Tribune, N. Y., 1870 and later.

C. B. Trinius. Species Graminum, 3 vols.

Dr. A. Vœlcker. Jour. Roy. Agrl. Soc., 1866, 1874.

R. Warington. The Chemistry of the Farm. London.

Webb & Sons, Eng. Permanent Pastures. A pamphlet.

J. C. Wheeler & Sons, Eng. Book on Grasses. A pamphlet. Botanist and Florist. A. Wood.

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