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**VIEW OF THE WORKS OF THE JOSEPH HALL MANUFACTURING COMPANY.**  
Located at Oshawa, Ontario. Established in 1851.

THE  
**LABOR-SAVING MACHINERY**  
**OF THE AGE!**



The undersigned begs to inform the public that he has secured the sole  
Right to manufacture or sell in the Dominion of Canada

**NEVINS' COMBINED POTATOE MACHINE.**

THIS MACHINE WILL

**MARK, PLANT, HGE, AND DIG POTATOES,**

AT A COST OF \$2.00 PER ACRE,

And will yield 25 per cent. more than when planted by  
hand in hills.

SEND FOR CIRCULAR.

**A. DOBBIE,**

THOROLD, Ontario.



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THE CANADIAN

# FARM ANNUAL

FOR

1880.

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PUBLISHED IN CONNECTION WITH

THE WEEKLY MAIL.

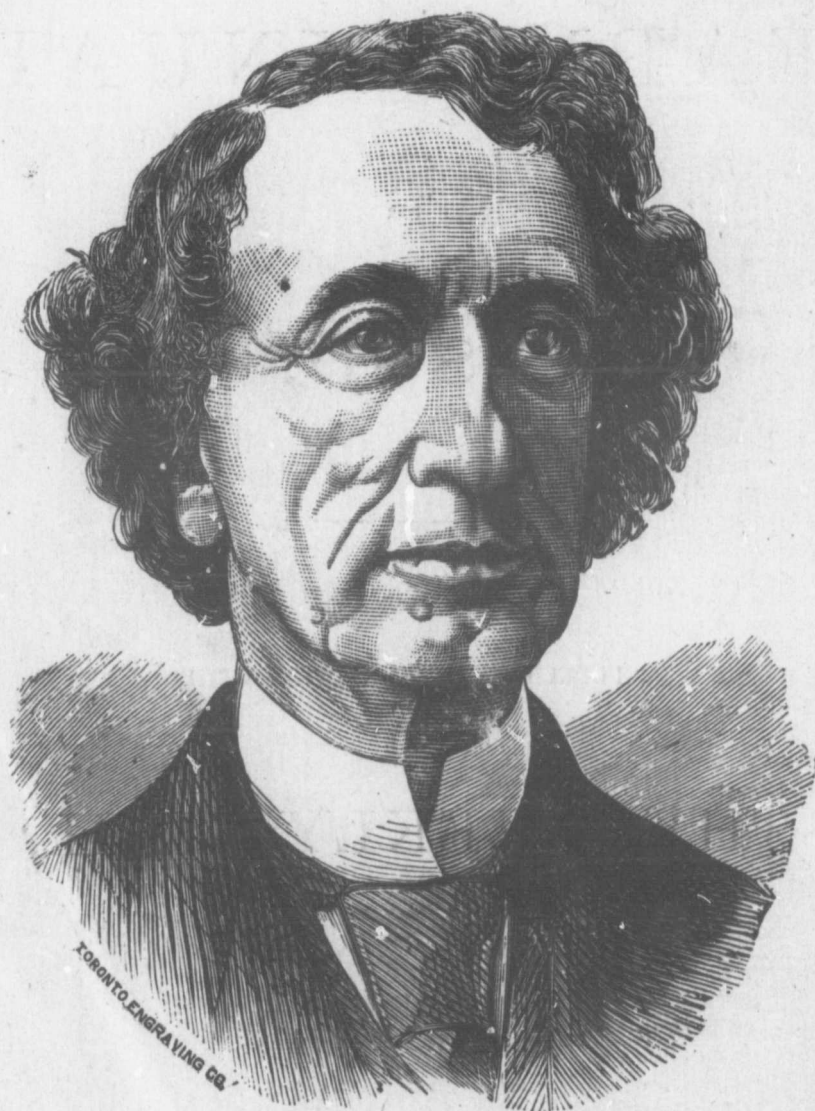
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Toronto:

THE MAIL, CORNER OF KING AND BAY STREETS.

1880.

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The Right Hon. Sir John A. Macdonald, K. C. B.

*Prime Minister of the Dominion of Canada.*

# FLUID K IMP SCIENTI

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Every vital a with a proportion and to renew th of all food. In into the various essential that th retained in the food incapable of pro brain, bone, etc., elements of whi proportion as fo form, so is it t Meat, or Beef Te less stimulant, se easily digested fo it is not general flavor of meat (t such are not in tion we quote fr Smith, H. Lethel

In the paper read by 1868, he says of Meat Ex

**JOHNSTON'S**  
**FLUID BEEF**  
**IMPROVED COOKERY.**

FOOD, LEECH, ETC. AND DRUGS—WATERBURY, LITH. BY H. W. HALL.

OR, THE

**SCIENTIFIC PREPARATION OF FOOD**

Has lately occupied some public attention, and it may be anticipated that a more general knowledge of the chemical composition, preparation, and physiological effects of food will be the result. In this connection we submit the latest theory for the preparation of a perfect beef tea or "hygienic food," and in soliciting a perusal, trust it may prove not uninteresting.

Every vital action, mental or muscular, is accompanied with a proportionate waste in the structures of the body, and to renew this continuous waste is the ultimate design of all food. In order that food may be thus transformed into the various parts of the living organism, it is first essential that the materials of such structures shall be contained in the food supplied, for the human system is absolutely incapable of producing muscular fibre, cellular tissue, blood, brain, bone, etc., out of substances which do not contain the elements of which those organs are composed. And in proportion as food contains such elements in an available form, so is it termed nutritious or otherwise. Extract of Meat, or Beef Tea, is everywhere acknowledged as a harmless stimulant, serviceable in prostration, or as an adjunct to easily digested food; but outside medical or scientific circles it is not generally known that such extracts are simply the flavor of meat (technically the soluble salts of flesh), and as such are not in any real sense nutritious. In this connection we quote from the standard authorities, Drs. Edward Smith, H. Letheby, and Baron Liebig:

In the paper read by Dr. EDWARD SMITH before the British Association, August, 1868, he says of Meat Extract: "When, therefore, you have excluded fat, fibrine,

size, combining  
 as being studied  
 follows.



— SIDE ELEVATION. —



gelatine and albumen, what have you left? Certainly not meat, as we understand the word for nearly every part of it which could be transformed in the body and act as food is excluded, therefore "Liebig's Extract of Meat" is not meat. It is clearly meat flavor. IT IS THE PLAY OF "HAMLET" WITHOUT "HAMLET," IT IS MEAT WITHOUT MEAT. Its true nutritive value is that which classes it with tea and coffee, and makes it a nervous stimulant. THE DELUSION rests with those who would regard it as a nutrient in the sense of meat or bread." And again: "Let its precise value be made known. Then we shall no longer have sick and dying men, women and children fed with Liebig's Extract of Meat, under the delusion that it is nutrient in the ordinary sense. Liebig's Extract is meat flavor—a nervous stimulant, and has good qualities, BUT IT IS NOT FOOD. All that is necessary for nutrition should be added to it."

The "London Examiner" says: "In making up the International Scientific Series, Dr. Edward Smith was selected as the ablest man in England to treat the important subject of foods." In his treatise on food, page 88, Dr. Edward Smith says:—"There is but little left in the extract to nourish the body, and the elements which it really possesses are salts and the flavor of meat which disguises the real poverty of the substance. If it then be asked why so much of the flesh is thus unused, we answer that only the soluble parts of the meat could be obtained in this form, whilst the insoluble but most nutritious parts are left behind, and only such of the soluble parts are retained as do not put on the putrefactive process, and hence nearly all nutritious matters are excluded. If it be further asked whether the popular belief in the value of this food is altogether based upon fallacy, we answer no, for it is a valuable addition to other foods, since it yields an agreeable flavor, which leads to the inference, however incorrect, that meat is present. If, however, it be relied upon as a principal article of food for the sick, it will prove a broken staff. ALL that is required for nutrition should be added to it. Liebig, in a letter to the "Times," stated that it is not nutrient in the ordinary sense, and Prof. Almes has shown the small nutritive value of this substance in the Transactions of the Medical Society of Upsala, in 1868. "USED ALONE FOR BEEF TEA IT IS A DELUSION."—Page 89.

Dr. H. LETHBRIDGE says: "False views have been entertained of the nutritive power of Extract of Meat, for as one pound of it represents the soluble constituents of 51 pounds of lean meat, it has been assumed that its nutritive power is in like proportion, but Liebig has taken care to correct this error by showing that the Extract merely represents the soup or beef tea obtained from that quantity of meat, and as it is deficient in albumen, it must be conjoined to substances which are rich in this material."—Cantor Lectures on Food, p. 165.

In the "Lancet" of November 11, 1865, Baron Liebig says:—"Were it possible to furnish the market at a reasonable price with a preparation of meat combining in itself the albuminous together with the extractive principles, such a preparation would have to be preferred to the 'Extractum Carnis,' for it would contain ALL the nutritive constituents of meat." Again:—"I have before stated that in preparing the Extract of Meat the albuminous principles remain in the residue; they are lost to nutrition; and this is certainly a great disadvantage."

For further reference see the works of Voit, Meissner, Bunge, *The British Medical Journal*, 1872, or any late authority on the subject.

To obtain a perfect Beef Tea, then, it is essential that the albumen and fibrine (which are the flesh-forming or nutritious qualities of meat) shall be added to the extractive or stimulative qualities, and that these shall be present in a form admitting of easy digestion by the most capricious and irritable stomach. This is the theory which led to the preparation of "JOHNSTON'S FLUID BEEF" (the only meat extract which fulfils all the conditions of a perfect food).

The "Christian Union," Glasgow, Sept., 1878, says:—"Some time ago a leading London journal threw out the suggestion that it would be a good thing if some practical analyst, or somebody else, would discover an extract of unusual strength-renewing property to resuscitate the enfeebled constitution of those who, by overwork or study, had sacrificed themselves. The idea was admirable, and one which thousands have often expressed. And it will be surprising and welcome to such to learn that there is already an Extract just of the nature so ardently longed for. We refer to JOHNSTON'S FLUID BEEF which possesses all the nutritive properties that can possibly be contained in any preparation."

The "Lancet," London, July 13, 1878, says of JOHNSTON'S FLUID BEEF:—"The peculiarity of this preparation is that the ordinary Extract is mixed with a portion of the muscular fibre in a state of such fine division that the microscope is required to identify it. It is unnecessary to say that the actual food value of the Beef Tea is greatly increased by this admixture, and the medical profession have now a Fluid Meat which is comparable in nutritive power to the solid. The new preparation is excellent in flavor, and we cannot doubt that it will be very extensively used."

JOHNSTON'S FLUID BEEF, then, is essentially an Extract of Beef, prepared upon the most approved principles, but differing from all other Extracts or Essences or Beef Tea, inasmuch as it is in combination with the actual Beef itself, and that in a form so assisting nature in the process of digestion that it is readily absorbed by the most hopeless dyspeptic or prostrate infant. Animal food offers a means of strength not furnished by any other article of diet, but from an enfeebled state of the digestive apparatus such nourishment has not hitherto been available to many who most require it. Digestion proper is the process by which food is chemically dissolved so that the nutritious elements which it con-

tains may be absorbed. change is effected when this juice is affecting the centre of the stomach, the centre of dyspepsia and its

The theory of the hitherto insurmountable results of meat diet to food. In its manufacture (lean of beef) is by a process of chemical action, which is dissolved in water. By chemical action is presented to chemically and in consequence, at once possible expenditure necessary to impart bone and muscle.

By WM. HARKNESS—Laboratory, Somers  
chemical analysis and it to contain in every 10  
Albumen and Gelatine  
Fibrine in a readily soluble form

The mineral matter the Fluid Beef to contain not the slightest trace of produce decomposition as it does, a concentrate in a form easily digested in ordinary extracts of HAVEN EVER EXAMINED By Dr. J. BAKER, F.R.S. and Inland Revenue Food careful analysis of it to contain:

Salts of Flesh and Moisture, Albumen or Egg Food  
I consider this an improvement on the well-known Liebig's nutritive value of EGG JUICE. It is therefore validly than Meat Extract manufacture, I am satisfied superior preparation.

By STEVENSON MA Analytical Laboratory, careful chemical analysis, and find it contains Albuminous or Flesh Matter Ash or Saline Matter

This is a highly nutritious in a concentrated form, for dietetic purposes, as Extract from "Papers" take such a substance as most popular food for changed into the actual not cause accumulation been strengthened by it before they used it.

In submitting the local physicians, we men named have ever Unsolicited testimonial

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tains may be absorbed by the system. With the lean of animal food this change is effected in the stomach by the action of the gastric juice, but when this juice is deficient in quality, or quantity, it is incapable of affecting the centre of the morsels of food presented to it, and they in this unprepared state leave the stomach, bearing with them the causes of dyspepsia and its train of concomitant evils.

The theory of JOHNSTON'S FLUID BEEF has however solved the hitherto insurmountable difficulty, and furnishes all the desirable results of meat diet to those who are otherwise unable to digest animal food. In its manufacture the albumen and fibrine (or rather the entire lean of beef) is by a special process desiccated and mechanically pulverised to such a minute degree of subdivision that it is almost imperceptible in water. By this means the entire surface of every microscopic atom is presented to the direct action of the solvent juice, which, acting chemically and in combination with the digestive properties of meat essence, at once prepares the food for assimilation, and with the least possible expenditure of vital force, furnishes to the blood all that is necessary to impart tone to the nerves and substantial food for brain, bone and muscle.

### CHEMICAL ANALYSES.

By WM. HARKNESS, F.C.S., L., Analytical Chemist to the British Government.—Laboratory, Somerset House, London, England.—I have made a very careful chemical analysis and microscopical examination of Johnston's Fluid Beef, and find it to contain in every 100 parts:

Albumen and Gelatine	21.82	Flesh-forming Food.	Ash or Mineral Matter	14.57
Fibrine in a readily soluble form	37.48		Moisture	26.74

The mineral matter is rich in phosphates. The microscopical examination shows the Fluid Beef to contain good, sound beef, ground to a very fine powder. There is not the slightest trace of fungus, spores, or any other organism which would tend to produce decomposition. I consider this a most valuable preparation, combining as it does, a concentrated extract of beef with the solid beef itself, the latter being in a form easily digested. It is also free from the burnt flavor so much objected to in ordinary extracts of meat. IT IS ONE OF THE MOST PERFECT FOODS I HAVE EVER EXAMINED.

By Dr. J. BAKER EDWARDS, Ph. D., S.C., L.; F.C.S., Professor of Chemistry and Inland Revenue Food Analyst, Montreal.—I hereby certify that I have made a careful analysis of the proximate constituents of "Johnston's Fluid Beef," and find it to contain:

Salts of Flesh and Moisture, Beef Tea Food	33.30	Fibrin or Meat Food	35.50
Albumen or Egg Food	22.50	Mineral or Bone Food	1.70

I consider this an invaluable preparation, containing as it does, in addition to the well-known Liebig's Extract—which has been aptly named "Wine of Meat," the nutritive value of EGG diet and MEAT diet in a form readily soluble in the gastric juice. It is therefore a more complete and perfect food for children and invalids than Meat Extract alone; and moreover, having inspected the process of manufacture, I am satisfied that it may be relied upon as a uniform and very superior preparation.

By STEVENSON MACADAM, Ph. D., F.R.S.C., F.C.S., Lecturer on Chemistry.—Analytical Laboratory, Surgeons' Hall, Edinburgh, 6th March, 1873. I have made a careful chemical analysis of a sample of Beef Powder, manufactured by J. L. Johnston, and find it contains as follows:

Albuminous or Flesh Matter	63.38	Moisture	13.23
Ash or Saline Matter	20.62	Oils and Fatty Matter	12.77

This is a highly nutritious article of diet, contains all the elements of Flesh Food in a concentrated form, is very palatable and easily digested, and is eminently suited for dietetic purposes, especially for invalids.

Extract from "Papers on Health," by Professor KIRK, Edinburgh.—"Suppose we take such a substance as Johnston's Fluid Beef, which we feel sure must become a most popular food for invalids. This readily passes into the circulation, and is changed into the actual living substances that make up the body of man. It does not cause accumulation of fat, for instance. Those who, to our knowledge, have been strengthened by its use, have got firm in muscle and nerve, but less stout than before they used it.

In submitting the following extracts from the letters of our leading local physicians, we feel justified in stating that few if any of the gentlemen named have ever before given a certificate for any proprietary article. Unsolicited testimonials from medical men reach us daily.

Dr. NICHOLS, 681 Spruce Street, Philadelphia, says:—"I have used it in a case of a child suffering from extreme debility after an attack of cholera infantum, the child began to improve immediately, and is still taking the Fluid Beef. I find it very palatable and nourishing, easily digested, and am satisfied that the contained fibrine is perfectly assimilated by the tissues of the body, as shown by a great gain of strength, &c. I feel assured it will meet with general favor."

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— SIDE ELEVATION. —

**SIR THOMAS WATSON, QUEEN VICTORIA'S PHYSICIAN,**  
PRESCRIBES JOHNSTON'S FLUID BEEF.

Dr. NOLAN, of the Academy of Natural Sciences of Philadelphia, says:—"Johnston's Fluid Beef has given entire satisfaction."  
JAMES TYSON, M.D., Professor of Gen. Pathology, Morbid Anatomy, in the University of Pennsylvania, says:—"I am using Johnston's Fluid Beef with a confidence which I have in no other preparation."

Dr. MALCOLM MACFARLANE, 1806 Chestnut Street, says:—"It is with unusual pleasure and confidence that I give my recommendation to Johnston's Fluid Beef. It is in the best form and the best preparation with which I am acquainted or have used."

Dr. LEONARDO JUDD, of Philadelphia, says:—"I can endorse thoroughly all that is claimed for Johnston's Fluid Beef, and am delighted with its superior excellence."  
Dr. HORNER, of Philadelphia, says:—"It is the most elegant preparation of the kind in the market."

Dr. SAMUEL ASHURST, 1423 Walnut Street, Philadelphia, says:—"I have tested Johnston's Fluid Beef and find it to be strictly what it is represented. I prefer it very much to any extract of beef with which I am acquainted, and unhesitatingly recommend it as a most desirable preparation."

Dr. C. S. MIDDLETON, of Philadelphia, says:—"Johnston's Fluid Beef has given me the most satisfaction of any article of the kind heretofore brought to my notice."

Dr. DANIEL KARSNER, 345 Girard Ave., Philadelphia, says:—"I have pleasure in confirming manufacturer's statements concerning its excellent and substantial food properties. It is exceedingly pleasant to the taste, and is in my opinion of incalculable value to the invalid."

Dr. JOSEPH KLAPP, 622 Spruce Street, Philadelphia, says:—"I feel assured that invalids and delicate persons in search of strength need only to use it in order to be convinced of the great advantages it possesses for that purpose."

Dr. S. R. SKILLEREN, 120 South 51st Street Philadelphia, says:—"It is the only preparation of beef that I have come across in which I have confidence, and I am sure its merits will recommend it wherever it is introduced."

Professor G. P. GIRDWOOD, McGill University, Montreal, says:—"I can strongly recommend its use to the public as supplying in the most easily digested form all the materials necessary for renewing the tissues wasted by disease."

Dr. ROSS, Montreal General Hospital, says:—"I believe it to be a most excellent nutrient for invalids and delicate persons."

Professor CHARLES CAMERON, Dublin, says:—"I can very strongly recommend Johnston's Fluid Beef."

Dr. MILLER, Edinburgh, says:—"It is a great boon to the invalid and to the public."

Dr. SMART, Edinburgh, says:—"I fully expect that it will ere long take precedence, both in professional and public favor, of all articles of a like kind, as it possesses qualities superior to all of them."

Dr. C. H. F. ROUTH, Senior, Physician to the Samaritan Hospital, London, says:—"It seems to me to fulfil a desideratum long sought for, and will prove of the greatest value in the treatment of disease."

Dr. DUNCAN, Surgeon, Allans S.S. "Polynesian," says:—"Patients suffering from vomiting in sea-sickness seem to retain it much better than any other preparation. I have ever tried, and do not complain of the nauseous taste so often objected to in some other preparations."

Dr. JOHN RUSSELL, Surgeon to the Newcastle-upon-Tyne Infirmary, says:—"The theory of its manufacture appeals to one's idea of what PERFECT BEEF TEA ought to be."

Dr. S. FRED. PEARSE, South Kensington, London, says:—"I find your preparation of Fluid Beef the best in every respect I have ever met with."

Dr. E. CLARK NEWTON, Surgeon to the Newcastle Lying-in Hospital, says:—"Johnston's Fluid Beef contains 50 per cent of nitrogenous or flesh-forming material. All other Extracts of Beef I have seen may be looked upon as stimulants only, and I have always deplored the confidence in their nutritious powers placed by invalids and the public."

JOHNSTON'S FLUID BEEF is now extensively used in British and Continental institutions, Hospitals and Asylums, and is prescribed by the medical faculty wherever it has been introduced.

Its adaptability is general to the invalid, the convalescent and the vigorous. To children it secures a strong muscular development, and for maternal nursing, imperfect mastication, athletic training, physical exhaustion, indigestion or mental overstrain, it is the perfection of known food.

DIRECTIONS FOR USE.—Add a small teaspoonful to a cup of boiling water and season to taste; or as a sandwich paste it may be used on toast, with or without butter. The can may remain open for weeks without detriment to the contents.

Sold by Druggists and Leading Grocers. Price 35c, 60c, & \$1.

**Robert Shoemaker & Co., Philadelphia. General Agents, U. S.**

LOCAL AGENTS: W. H. SCHIEFFELIN & CO., WM. ST., NEW YORK.  
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Manufactured by JOHN L. JOHNSTON, Montreal, Canada.

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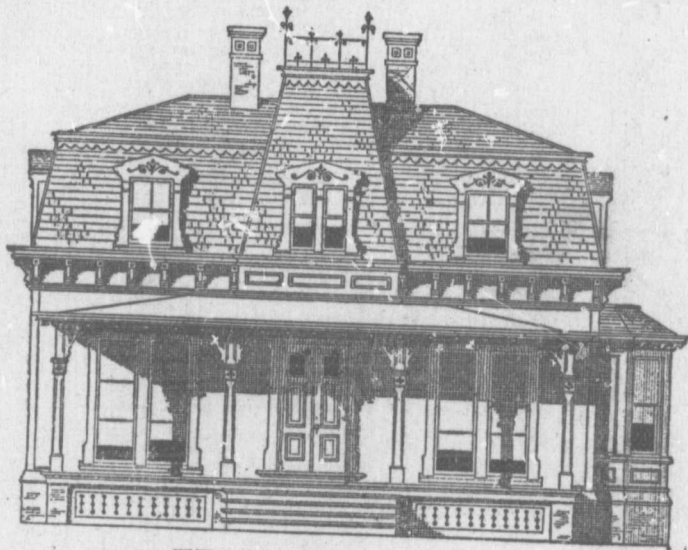
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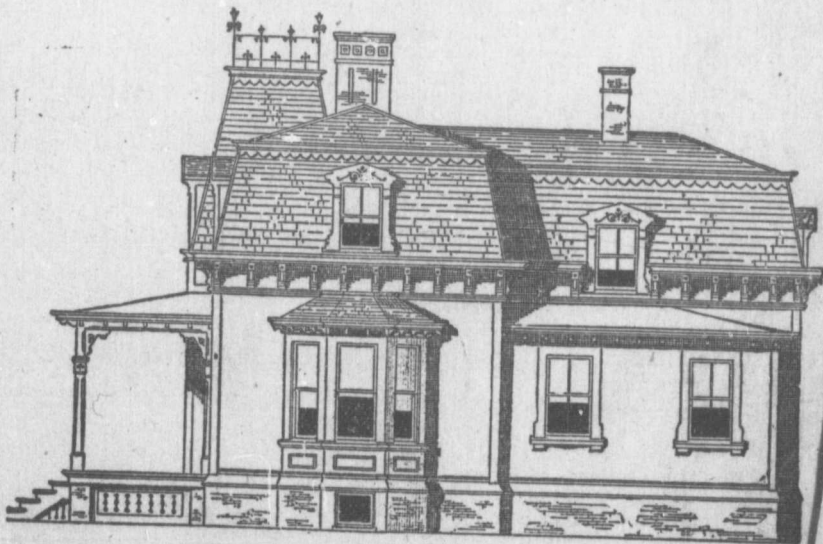
## DESIGN FOR SUBURBAN VILLA.

The following plans and elevations are for a residence of modern size, combining utility and convenience of arrangement at moderate cost, the rooms being studied with regard to symmetry in their several parts. A full description follows.

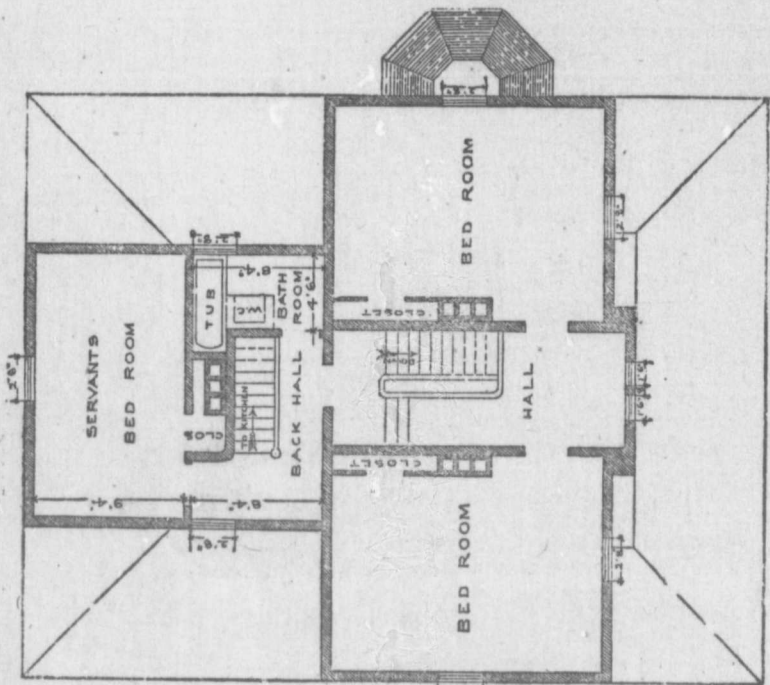
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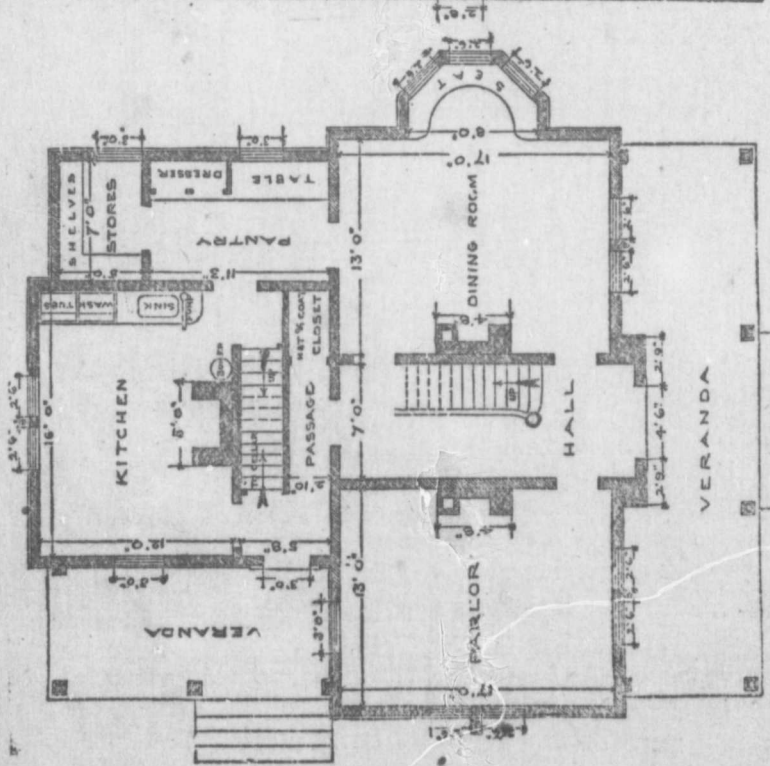
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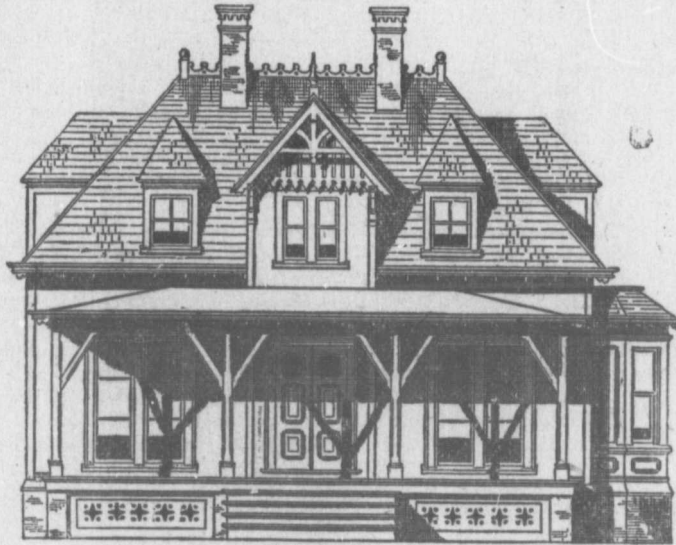
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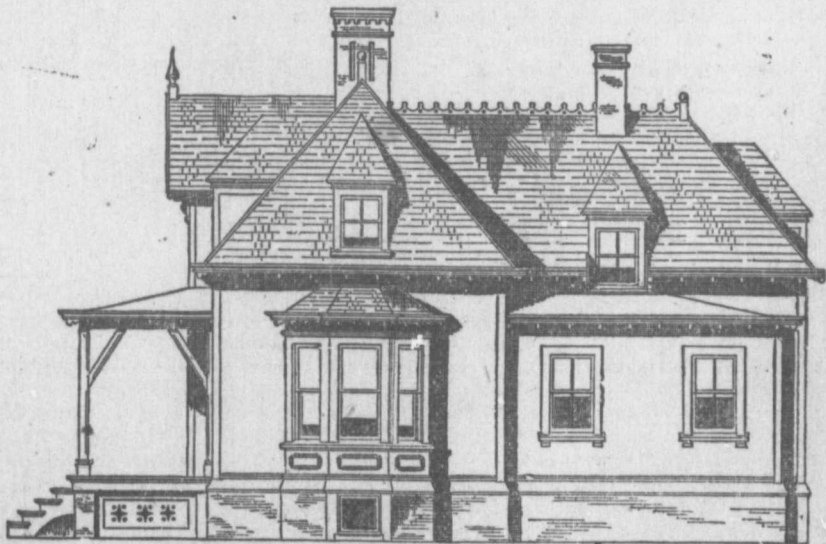
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The parlour and dining-room are of ample size and similar, with the exceptions of a bay-window, which forms a part of the latter room. The staircase hall is spacious, and with its ornate staircase cannot fail to produce a pleasing impression. At the farther end of the hall a door communicates with the back hall, which is lighted by

DESIGN No. 2.



FRONT.



SIDE.

a fanlight over the outside door ; this contains a back staircase for the servants' use. There is also a closet for hats, coats, rubbers, etc., which will be found extremely handy ; if desired, a wash-basin could be placed here, with a ground-glass

SECOND FLOOR.

FIRST FLOOR.



window in the partition over it, which will give light from the pantry outside window. A conveniently arranged side entrance from verandah gives easy access to the cellar or kitchen, the latter apartment having provision for range and other necessities, shown on the plan. Conveniently near the kitchen is the dining-room, a pantry connecting the two rooms, and provided with an inclosed dresser for china, a table with enclosure under for barrels, a good-sized and well lighted store-room, with three tiers of shelves and as many drawers under them, provided with the necessary pulls, fastenings, etc.

The second story contains bedrooms, bath-room, closets, etc. The plumbing is kept together as much as possible so as to avoid expense in material, cutting away of beams and timbers, etc.; the pipes running close to the chimney are therefore free from all danger of freezing; the tank is in the loft directly over the bath-room, the ceiling of which is lowered a little to admit it; a lift and force pump is located in the kitchen to supply the tank when it cannot receive water from the roof.

The height of stories are 9 feet 10 inches and 9 feet 6 inches respectively; the kitchen portion is 8 feet high.

The exterior is designed after the French style, with one of the many modifications of the roof which M. Mansard, the eminent French architect, first used, and which is distinguished from other roofs by the inventor's name. It is a very popular form of roof, and some of its advantages may be here enumerated; upper rooms can have their walls furred and finished to show square, an advantage which is readily apparent, and this with little or no waste, in room, and with slight addition in cost. There is also another advantage gained in furring out the room—an air space is thus formed between the walls and roof, which renders these rooms more comfortable both in summer and winter. This pattern of roof is also capable of receiving a highly ornamental finish, extremes of which however should be studiously avoided.

The second design partakes more of a gothic character, a style preferable to many on account of its picturesque beauty, a qualification which is not always in roofs of another class. This portion of our design is very high compared to the rest of the house, and is the principal characteristic feature, as it should always be in villas in this style.

The ornament cresting and finials on the ridges, framing and sawed work in gable, the veranda, etc., all contribute to give character to the building, together with a pleasing and effective appearance. A band of coloured or ornamental cut slate might be worked in the roof with good effect.

## DESIGN FOR A COUNTRY HOUSE.

We have endeavoured to produce a design for a country residence suited to the requirements of a moderate-sized family. The plan, it will be observed, is compact and conveniently arranged, and combines all the modern improvements with the smallest outlay of money. The style chosen is that known as the "cottage style" of architecture, which admits of a considerable amount of ornamentation. It is intended that the house shall front toward the south or south-east, to insure the beneficent effects derived from sunlight, which will then be in the rooms most used. The house is approached by steps leading to a broad veranda, and passing through a double entrance door, we enter the hall, which is of good size and form to give a lofty appearance. From the hall, at the right, is the sitting-room, which will, if the house is placed properly, have the sun the greater part of the day, a matter not to be left unconsidered in the designing of a country home, the architecture having no small share regarding the comfort and health of its future occupants. The sitting-room contains also a bay-window. At the left of the hall is the dining-room, being of a good form, and having an ample bay-window, which adds con-

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siderably to the interior appearance of the room. This is provided with an upholstered seat running around ; or, if desired, the window could be fitted up for the reception of plants. There is a large china closet, and leading also from the dining-room is a goodly sized pantry containing dresser, table, etc.; from the pantry there is an ample store-room.

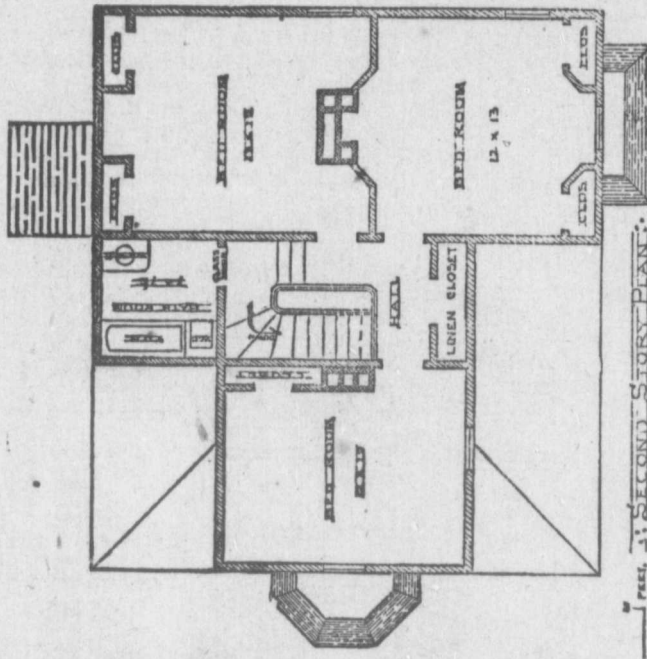
The kitchen is so placed that ready access may be had, either with the dining-room, pantry, or cellar, and is, as it always should be, well lighted, and thoroughly ventilated by means of a large ventilating flue in the chimney.

The stairs leading to second floor have black walnut newel, balusters, and hand-rail, the whole being well oiled. The bath-room is directly off the stair landing, and a little lower than the other rooms on this story, and is furnished with the necessary conveniences. The bed-rooms, three in number, are of good size, pro-

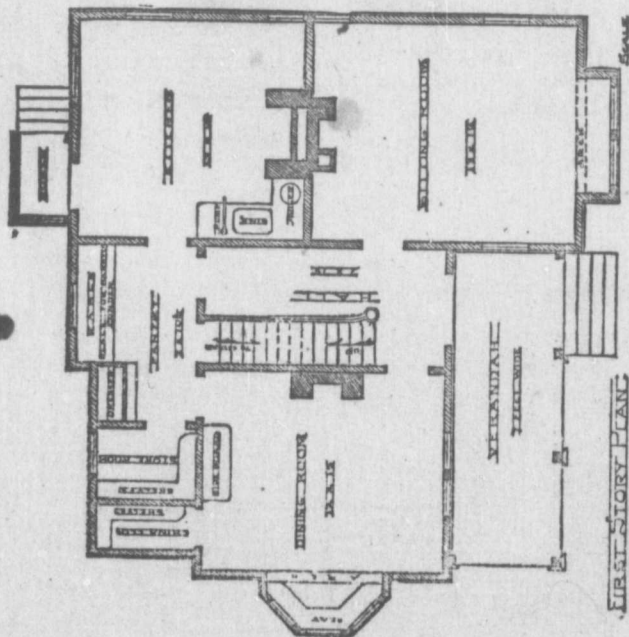


vided with ample closet room, and all well ventilated. Particular attention has been given to the matter of ventilation, the pantry and bath-room being ventilated by means of flues carried up to the loft and there connecting with ventilating flue in the chimney. The linen closet is placed at the end of the hall. There is provided a step-ladder and scuttle for access to loft ; this is sufficiently lighted by the windows in gables. The tank, which is located in the loft, is of about 900 gallons capacity, and is supplied from the pump in the kitchen. A cellar extends under the whole building. The laundry being directly under the kitchen, and fitted up with stationary tubs, hot and cold water, and all the necessary appliances to make it complete. A basement door and steps furnish egress out of doors. A water-closet is also provided for in the cellar. The windows coming at veranda on first story are brought to the floor, and slide into the wall, which is furred to receive

them. These windows, when open, will admit of a person walking through without stooping. They are constructed in a manner better able to resist the weather than the French windows, and are much better adapted for curtains.



1/4" FEET. 2, SECOND STORY PLAN.



1/4" FEET. 1, FIRST STORY PLAN.

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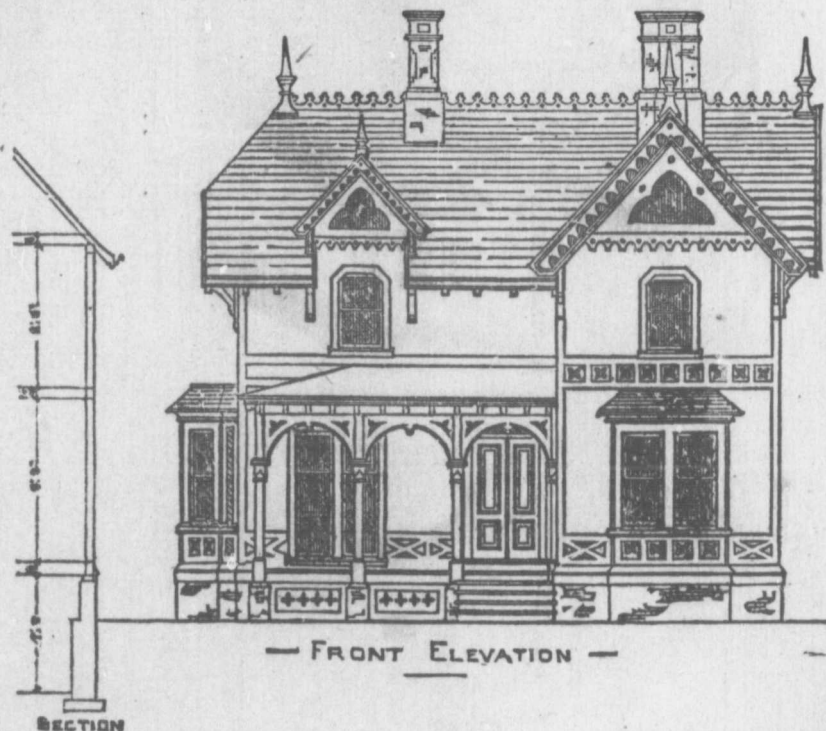
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The plumbing is kept on inside walls, and near as possible to fireplace, to prevent its freezing. This should always be attended to, thereby in a great measure obviating the necessity of repairing bursted pipes and saving annoyances and trouble attendant thereon.

The exterior of this house is not lacking in beauty, a sufficiently varied outline being secured to produce a picturesque and highly pleasing appearance. The ornamentation is of a simple character, and could easily be executed by any intelligent builder, with moderate cost. The beltings on gable fronts and bay-windows being panels inclosing perforated figures. This house, painted in a light body colour, with the cut patterns and chamfers brought out with vermillion, can not fail to produce a handsome effect. The cost of the house will vary in different localities, and

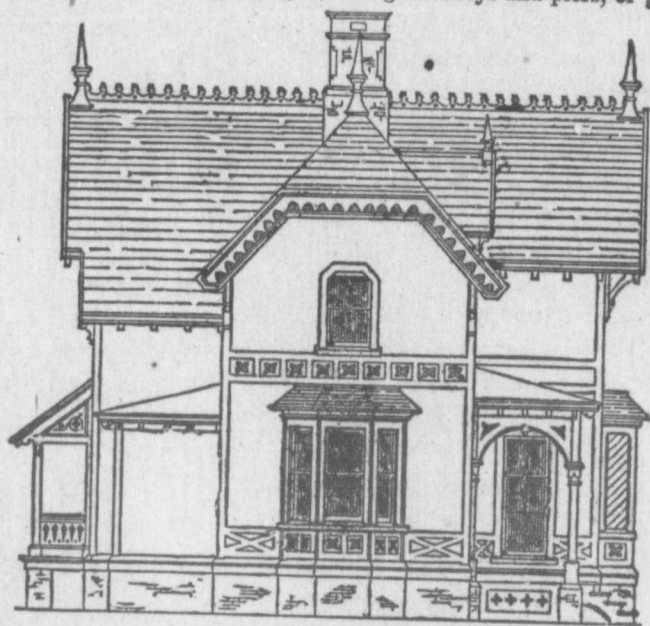


in different hands, so that it will be almost impossible to give an exact estimate ; but it may be taken at \$4,000, without going far astray. A general specification is given below :

All the timber to be of spruce. Floor beams, first and second stories, 2x9 inches ; for loft, 2x8 inches, all 16 inches from centres ; veranda and porch beams, 2x7 inches, 18 inches from centres ; outside studding, 3x4 inches ; inside studding, 2x4 inches, placed 16 inches on centres, and blockbridged. Sills, 3x6 inches ; plates, 4x4 inches ; interties, 4x6 ; girders, 5x7 ; rafters, 3x5, placed 24 inches from centres ; ridge pieces, 1½x9 inches. Veranda and porch rafters, 3x4, placed 20 inches from centres, the rafters to be cut at end and show finished ; these ends to be of pine. The siding to be of hemlock boards ; this to be covered with building paper, and then clapboarded with pine clapboards. The roofs to be covered with hemlock boards and slated with good quality of slate. The veranda and lean-to roofs, also bay-window decks, to be tinned with I. C. charcoal tin. The necessary flashings and linings for gutters, etc., to be of good quality tin I. C. thickness.

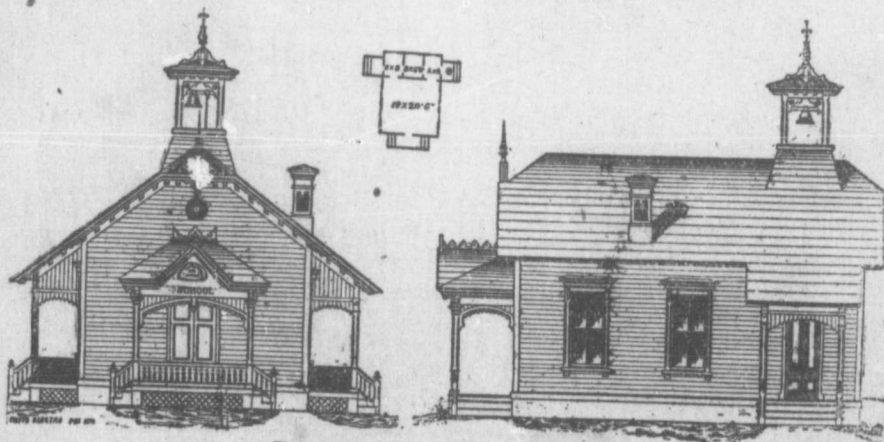
## DESIGN FOR A SCHOOL HOUSE.

All exterior woodwork to be of clear, well seasoned white pine. The trimmings for doors, windows, belting courses, etc., to be  $1\frac{1}{2}$  inch thick. The foundation to be of stone and the under-pinning, including chimneys and piers, of good quality



— SIDE ELEVATION —

face brick. The glazing to be of French glass. Three coats paint inside and out. The bay-windows will have inside blinds; other windows to be provided with outside rolling blinds.



Design for a School House.

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## WHAT WILL HE DO WITH IT?

Of late years many enterprising farmers, hearing of the fortunes made by introducing new varieties of seed grain, potatoes, &c., have made a specialty of growing seed. Where they have managed judiciously they have almost invariably done well, and their neighbours, for miles around, have willingly paid them much above the ordinary market price for what seed they required.

In a year or two, however, the farmers in the vicinity were stocked with that variety, and at the same time the grower had the most seed to spare; the question naturally arose, "What will he do with it?"

Last spring, a farmer in the County of York, was in just such a position. He had several hundred bushels of White Russian Wheat, but his neighbours were supplied, and he feared he would have to sell the balance to the miller at ordinary market prices. As an experiment, he advertised it in the *Weekly Mail*, at a cost of one dollar. In less than a week his wheat was all sold, and the people were writing for more. He made over \$200 by that dollar advertisement.

## COTTAGE DESIGN.

A brief examination of the floor plans and perspective will show the admirable arrangement of the interior and the beauty and excellence of the design. The rooms are all spacious and of easy access and communication, and the closet and storage conveniences are very complete. On the first floor are parlour, dining-room, and kitchen; on the second floor are four chambers, and a bath-room. Every room is accessible direct from the hall. The second story hall pantry contains the stairs to the attic, where a couple of bed-rooms could be finished off if desired. A cellar, 7 feet in the clear, extends under the entire building.

The general exterior finish is shown by the perspective sketch. The brick walls are carried up to the second-floor beams, where a simple and effective belt cornice divides the brick-work from the frame superstructure. The facade, with its porch, veranda, balcony, and gable work is very unique and striking, and the whole design can be carried out for about \$2,800.

*Modification.*—In view of the extensive adoption with which this design will doubtless meet throughout the country, and also considering the varied requirements among those wishing to adopt it, attention is invited to the following modification, by which additional spaciousness to the first floor is secured without materially affecting the cost of the building.

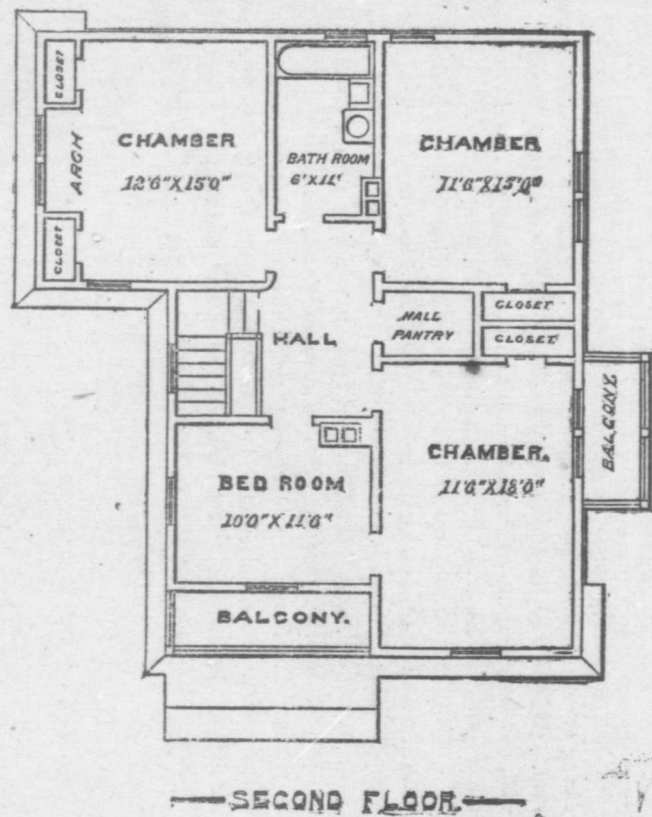
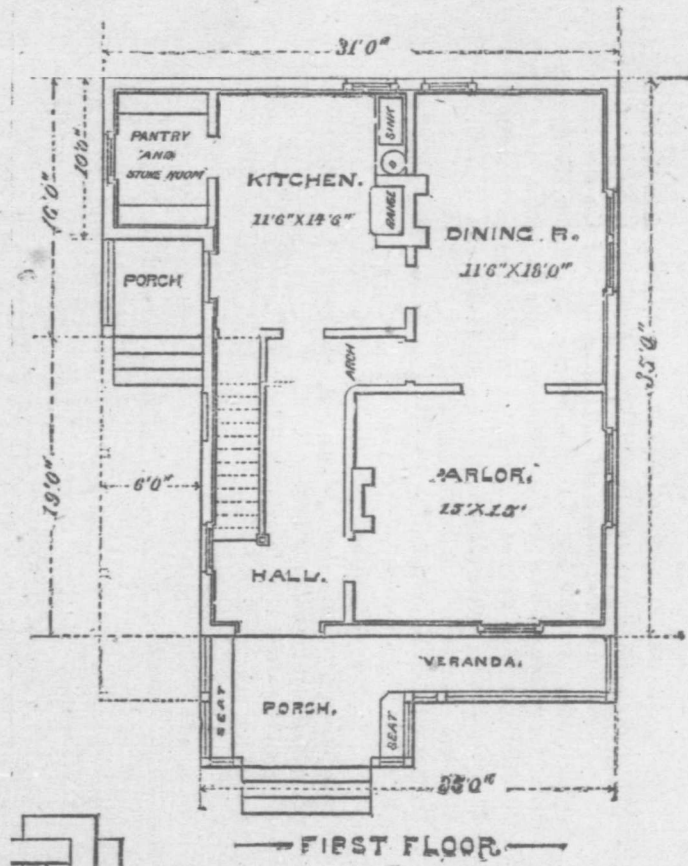
Substitute frame construction for the brick walls of the first story; continue the veranda around the side of the building, as shown by dotted lines of first-floor plan, and extend the hall window to the floor. Use the present kitchen for dining room, utilizing the space now devoted to store-room and porch in enlarging the dimensions of the room, and communicate the dining-room with veranda by long window.

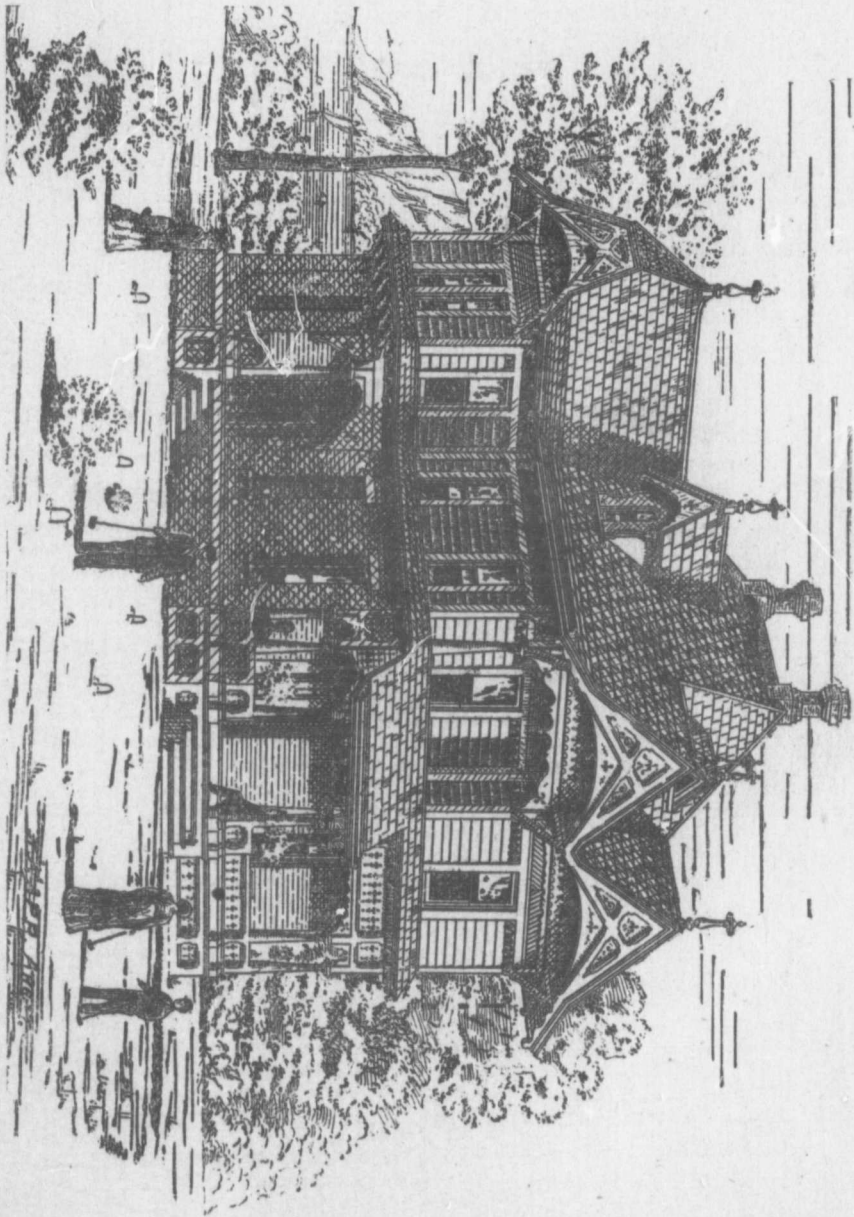
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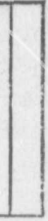






SECOND FLOOR

FIRST FLOOR



## FENCE BUILDING.

## SYSTEM IN SPLITTING.

It is a matter of much importance to do the work of splitting in the best way. A novice might spoil half the timber, and expend double labour in doing it—splitting some rails too large, others too small, and often making rails twice as large at one end as at the other. Fig. 1 shows the sawed end of a log which is ready to split.

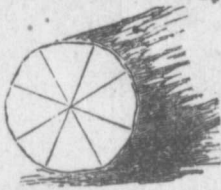


Fig. 1. MARKING LOGS FOR SPLITTING

Take a piece of red chalk, or a carpenter's black lead pencil, and with the help of a straight-edge, draw the two marks or diameters across it at right angles, as shown by the larger lines, then draw two others where the dotted marks are seen. This will cut the log in eight pieces, after which it should be again regularly subdivided, according to its size. If two feet or a little more in diameter, it may be laid out for fifty-six rails, as shown

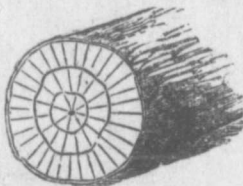


Fig. 2.—MARKING LOGS FOR SPLITTING.

in fig. 2; varying with the intended use of the rails. If for a common zig-zag fence, the rails measure about the same in breadth and thickness; but if for post and rail fence they should be flat and broad. Either of these forms may be easily made by increasing or lessening the number of cross-connections between the radiating lines.



Fig. 3.

Fig. 3 represents a log about a foot and a half in diameter, marked for splitting into twenty-four rails; and fig. 4 another a little larger and straighter, and more free of knots, marked for splitting into thirty-two flat rails, and eight common ones. These different modes of laying out the work will show sufficiently how it is done, and enable any one of moderate intelligence to mark out any log of whatever size, by a little variation. After this is done, the splitter will proceed rapidly with his work, without hesitation, or without losing time in pondering where he shall next set his wedge. He will save both time and timber, and turn out better and more uniform rails.

Every one who has split wood of any kind, knows that in order to prevent the cleft from running off on one side or the other, it should be nearly in the middle of the stick. Hence the general rule, to keep reducing the size of the sections, not as some would suppose, by taking off a rail from the side, but by striking directly through the centre. The log should therefore be split in two, and these halves again into four quarters—one of which is shown in fig. 5. This is to be again split into the two parts, fig. 6; and these again in the manner indicated in fig. 7. In this way, there will be but little tendency to form uneven rails; and if the cleft is controlled somewhat by striking the wedge or axe a little ahead, no trouble whatever will occur.



Fig. 4.

## LAYING OUT THE FENCE.

In laying out a zig-zag fence, various modes are adopted for fixing the places for the corners; but the most perfect, and perhaps the most rapid, is to stretch a cord or line (which, if the weather is not windy, may be 20 rods long), and keeping it to its place by flat stones laid on it, proceed to lay off each corner. Take a rod or a pole a foot less in length than the rails, place the middle on the line, and then give it such a divergence from the line as will be suitable for a firm fence. Stick

in a peg or stick work will be just long enough



Fig. 5.

or many fences out the fence is through and through and each length, an off, right and left corners, by the this way two accuracy several

Such fences is a prominent lines, *a a*, fig. 8 the fence and commonly built—rod of the stakes, wner, are easily nearly a rod wide one acre for ever More than one is saved by setting, where together; and are plough. The saving the fence, is most perfect fence is the one made

A substantial, regions where abundance, as should be split the posts—borin for this purpose. the work is cheap performed during of earth obviating an addition post, renders it rails, being dressed other in the hole rails as the posts they cannot come



in a peg or stick at each intended corner, and so proceed till all is laid off. The work will be greatly facilitated by nailing a piece of lath at right angles to the pole, just long enough to reach from the line to the corner. Where a long line of fence,



Fig. 5.



Fig. 6.

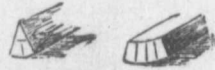


Fig. 7.

or many fences are to be built, a still more rapid and equally perfect mode of laying out the fence is to take a cord and mark it off in equal divisions, by sticking a pin through and twisting it round the cord, at each length, and then after stretching it, lay off, right and left from these pins, the proper corners, by the help of a measured stick. In this way two men can lay out with great accuracy several miles in a day.

Such fences occupy too much space, which is a prominent objection to them; the dotted lines, *a a*, fig. 8 showing the full breadth which the fence and stakes must take up, as commonly built—requiring, in order to keep clear of the stakes, which, set in this sloping manner, are easily knocked out, a strip of land nearly a rod wide, which is equivalent to about one acre for every line of fence 160 rods long. More than one-half this space, or from *b to b*, is saved by setting the stakes as fig. 9 represents, where they are vertical and wired together; and are less easily thrown out by the plough. The same advantage exists with staking the fence, as shown by fig. 10. But the most perfect fence for convenience, neatness and saving of land which it occupies, is the one made of post and rails, or of boards, fig. 11.

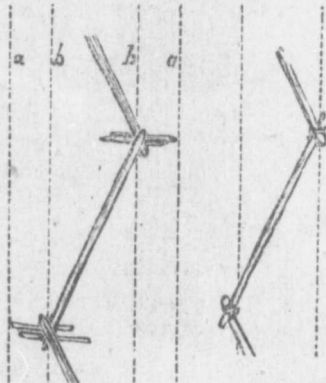


Fig. 8.—WIDTH OF ZIG-ZAG FENCE.

Fig. 9.—ZIG-ZAG FENCE MADE NARROW BY STAKING.

POST-AND-RAIL FENCE.

A substantial, cheap and durable fence is made in those regions where chesnut and other good timber grows in abundance, as represented by fig. 13. The rails and posts should be split flat. The modes are used for perforating the posts—boring and cutting with a two-handed tool made for this purpose. If the former can be done by machinery, the work is cheap and rapid; and cutting the holes may be performed during the leisure of winter. The bank or ridge of earth obviates the necessity of a bottom rail, saves cutting an additional hole for the post, and by stiffening the post, renders it unnecessary to dig so deep a hole. The rails, being dressed off wedge-form at the ends, pass each other in the holes. It is therefore necessary to insert all the rails as the posts are successively set in, and after once in, they cannot come out or become displaced.

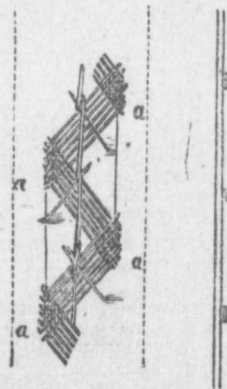


Fig. 10.—BEST MODE OF STAKING COMMON RAIL FENCES. Fig. 11.—VERTICAL VIEW. RAIL FENCE.

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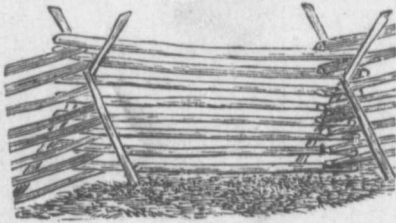


Fig. 12.—COMMON ZIG-ZAG FENCE.

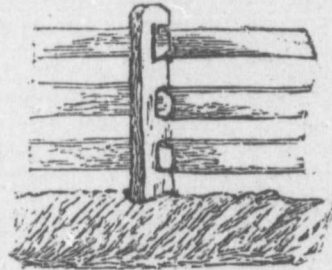


Fig. 13.—POST-AND RAIL FENCE.

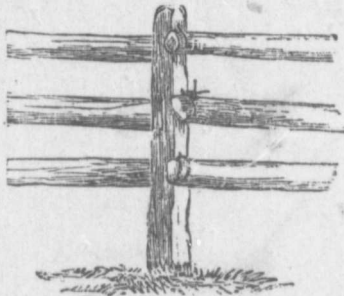


Fig. 14.—CATTLE FENCE.

A good cattle fence of posts and common rails is shown by fig. 14. If sheep are not kept on the farm, such a fence is quite sufficient, as no good and neat farmer allows his swine the run of his fields. Good stiff posts (which may be split ones, as no facing is essential), are inserted a few inches nearer each other than the length of the rails, and the rails are then secured as shown in the cut, by telegraph or fence wire, inserted through holes bored with a brace-bit, through both rails and post, and again through the post alone just above the rails. The best way to hold the rails is to provide wooden horses, each with two legs, as shown in fig. 15, the height of which may be easily regulated by placing them more sloping or erect against the posts, according to the desired height, and on these horses the ends of the rails rest while the boring and wiring is performed. These supports are simple, easily made in a few minutes, and a good supply of them will save much time in building. If there is a great difference in the height of the rails, two sizes would be desirable.



Fig. 15.—TWO LEGGED HORSE FOR SUPPORTING RAILS—LEANING AGAINST POSTS.

they should be and the posts should be good and substantial ones. It will save much labour if the boards have been sawed from accurately measured logs, so as to be all of precisely the same length as already shown. The distances of the posts asunder may then be measured accurately with a pole, and every board may be nailed to its place with very little waste in cutting. After having nailed on the boards (of course without breaking joints), a small piece of timber or batten is placed upright and midway between the posts, and firmly secured by nailing through the boards into it. These

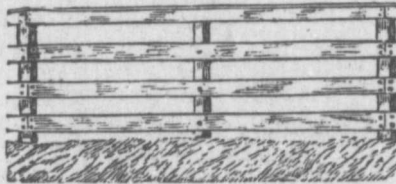


Fig. 16.—POST AND BOARD FENCE.

battens may be of any size, only one size, and secured to the posts the top edge of the batten should be of much importance and in considering the width of the space of about four inches below the bottom of the batten, so as to form a low lumber, stiff drainage, and like to stand up to these animals.

If this fence is long, it may be between the posts make a fence with a lower board thick, and nailed it would be stiff.

Board fence widest and sturviest at top order were recommended on the climbing over it. For the sake of if only three in edge of the top

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battens may be made of sawed timber 2 by 3 inches; or of split slabs of about the same size, only one straight side being necessary. A cap-board is then placed on the top and secured by nailing into the tops of the posts the top of the batten, and into the upper edge of the top board. This cap-board is of much importance, stiffening the fence, and in connection with the batten, rendering the whole firm and substantial. A space of about one foot should be left below the bottom board, to be ploughed up to, so as to form a ridge. This saves some lumber, stiffens the posts, forms surface drainage, and prevents young horses from leaning against the fence, as they do not like to stand in the ditch. This ridge should not be made too wide at the top, or these animals will stand upon it and push against the fence.

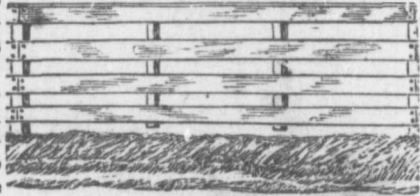


Fig. 17.—POST AND BOARD FENCE.

If this fence is likely to be much exposed, and if the boards are 16 or 18 feet long, it may be best to place two battens between the posts (as in fig. 17), which will make a fence of great firmness, in connection with a substantial cap-board. If the lower board could be an inch and a half thick, and nailed with twenty-penny nails, it would be still better.

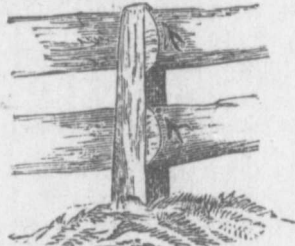


Fig. 18.—SLAB FENCE.

Board fences are often made of boards the widest and strongest at bottom, and narrowest at top. It would be better if the order were reversed, as the hardest usage comes on the top board, whether by persons climbing over, or by cattle crowding against it. For the same reason it is always a matter of economy to use a cap-board, even if only three inches wide, as it becomes a firm stiffener when nailed to the upper edge of the top board.

SLAB FENCES.

In lumber regions, and in the immediate neighbourhoods of sawmills, good, strong durable slabs may be had at a low price, and may be made into cheap and substantial fences. Fig. 18 shows the manner in which the slabs are attached to the posts by means of large annealed or telegraph wire. A single nail driven through the upper part of each end of the slab secures it temporarily to the post, till two holes are bored with a brace-bit through both slabs and the intervening post. The wire is then passed through, drawn tight, and firmly twisted. This fence, if the wire is large enough (and it should not be less than No. 9), will make a firm barrier against cattle and horses. Fig. 19 shows the structure in section; and fig. 20 the appearance of the whole when completed, with batten between the posts for stiffening the slabs, and the ridge of earth beneath for increasing its efficiency.



Fig. 19.—SECTION OF SLAB FENCE.

In building fences on uneven ground, awkward workmen often make them unnecessarily deformed in appearance by trying to follow the surface without regard to the angles formed in the line of the boards. Fig. 21 represents a crooked surface, over which a fence is to be built. Fig. 22 shows the kind of fence too often built over such a surface by a bungler. Fig. 23 is a handsome, graceful, finished fence as made on the same ground by a skilful hand; room enough being allowed under the bottom board to make an embanked ridge by ploughing a few furrows against the life, and afterwards smoothing with spade or hoe, as described in another part of this article. The curve is



Fig. 20.—SLAB FENCE.



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first given to the top board, and all the rest follow parallel to it. The mode by which the curve is easily and readily made is shown in fig. 24, where, by deviating slightly from a straight line, a uniform curve is formed. This deviation may vary at each post from the fourth of an inch to an inch or two, according to circumstances; and a long curve may be made to pass by insensible gradations into



Fig. 21.

short one, by increasing the deviation regularly—or the reverse, by diminishing it. This work may be accomplished by using a straight pole long enough to connect three posts; or more rapidly and easier to the practised workmen, by slightly driving a nail in each post to range by.

Sharpening posts and making holes with the crowbar in the bottom of spaded holes, for the purpose of saving the labour of digging the holes to full depth, is sometimes recommended and put in practice. It has some advantages—a prominent one being the firmness with which the bottom or end of the post is held by the hard subsoil into which it is driven by the maul at the top; and as a post never decays below till long after it is rotted at the surface of the earth, it need not be so large at the lower end. But a serious difficulty results from the impossibility of setting such posts in a straight line, both the crowbar holes and the sharpening often placing them an inch or two on one side or the other, and rendering the fence zig-zag and distorted. This mode will, however, answer for cheap fences, as, for example, those made of slabs, and which are intended to stand but a few years.

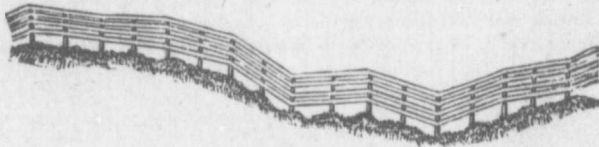


Fig. 22.

To make a durable, handsome, and perfect fence, the earth should be firmly beaten down with an iron-shod rammer, as it is shovelled in by small portions at a time, keeping the post accurately in position against a stretched cord or two cords. A post thus set should stand as firmly in the earth as if it stood in solid rock. We have seen a fence thus made which had not twisted three inches from a straight line in twenty-four years—perfect underdrainage having been provided beneath it; while another and adjoining fence, with posts more carelessly set, had become nearly worthless from the distortions to which it had been subjected.



Fig. 23.

After constructing many miles of farm fences during a long period of years in farm fencing, we find the kind here described the best, as combining cheapness, strength, durability, and neatness. For strength it is superior to common board and rail fence, and is only equalled by the well-known post-and-rail made by mortising the posts and inserting the rails. It is the most durable timber barrier we

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are acquainted with. Being on a straight line, it occupies but little land. It does not form so great a barrier against wind as a common board fence, and for this reason snow drifts do not accumulate under it to so great an extent. It is much cheaper in construction than either of the kinds we have named. It consists simply of good posts and common rails, which are secured to the posts with screw bolts and nuts.

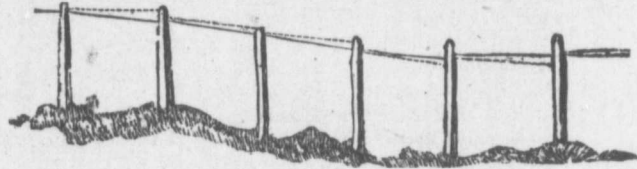


Fig. 24.

We have set the posts most expeditiously and at less expense than by the common mode, by the process which we here describe. First, a long cord or garden line is stretched where the fence is to be placed. If the rails to be used are 12 feet long, a pole 11½ feet, or at least 11¼ feet long, is used for inserting pegs at each post hole. The line is then removed, and the digging begins. But before commencing, procure a board 6 or 7 feet long, and about a foot wide, cut as shown in fig. 25. At the middle cut a half-circular opening large enough to receive half the post. At each end, and in a straight line with this opening, and at exactly equal distances from it, bore a hole with a small auger. Then on the other edge of the board make a small notch an inch in, and bore two other holes like the first mentioned, at equal distances from the notch, and in a straight line with it. Before beginning to dig the holes, lay this board on the ground, so that the peg (showing where the post is to stand) shall fit the small notch in the middle of the board, fig. 26. Then insert into the ground small pegs through the auger holes at the ends, which are in a line with it. Then remove the board and dig the post-holes, fig. 27. A number of post-holes may be dug in this way, taking care to leave undisturbed the peg on each side. The posts are then ready for setting. Fig. 27 shows the line of fence at the dotted line, and the board and pegs set by it at the right.

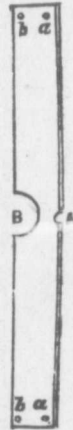


Fig. 25.—BOARD FOR SETTING GATES.

Round posts do well for this kind of fence, but any other shape may



Fig. 26.

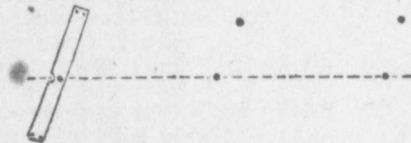


Fig. 27.

be used if they are all about the same thickness. To set them, place the board again on the two pegs, but in the holes on the other side, which are in a line with the large semicircular opening (fig. 28). Set the post in this opening, and make it plumb, and it will be exactly where it is to stand (fig. 29). Throw in earth and pound it solid, taking care not to throw in more than an inch in depth at a time, in order that the whole may be beaten hard.



Fig. 28

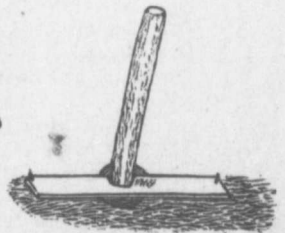


Fig. 29.—POST SET IN THE HOLE AND SOCKET.

When the hole is a third full the board may be laid aside and the filling completed. Posts set successively in this way, along the line previously marked out as already described, will stand in a straight row, without the trouble of stretching lines to set them by, or of stopping to "range" each way to see if they stand in a row with the rest. As a consequence the work will go on more rapidly, they will be at uniform distances from each other, and labourers of ordinary ability will do as well as skilled workmen by the old way. We have set long lines of fences in this way with much satisfaction.

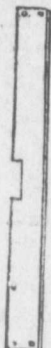


Fig. 30.

The same method may be adopted in setting flat-faced posts, in which case the central opening, instead of being semicircular, has a flat side, as shown in fig. 26, the two auger holes being in a straight line with this face, and the board when laid on the ground being placed carefully in a line with the direction of the fence.

The next thing is to screw on the rails, as shown in the completed fence in fig. 31. The screw-bolt shown in fig. 32 is long enough to pass through the end of a rail on each side and through the post in the centre. The length will be governed somewhat by the size of the

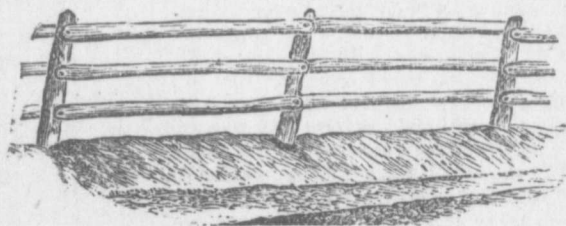


Fig. 31.—COMPLETED FENCE.

posts and rails, but as the ends of the rails are first slightly flattened with an axe, their thickness may be partly made to correspond with the length of the bolt. We find those 10 inches long to answer a good purpose—9 inches might do well. If they are five-sixteenths of an inch in diameter they will be strong enough, and will just fit a hole bored with an auger three-eighths of an inch.

The boring is rapidly done with a brace-bit. The mode in which the rails are placed on opposite sides of the post is shown in figs. 33 and 34.



Fig. 33.—MODE OF SECURING RAILS.

The fence, when completed, should be about 4½ feet high, and unless small animals have the run of the farm, three rails, with a small ridge, will be sufficient. The top rail should be bolted on first, the hole being bored about 4½ feet high. The other two may be about 14 inches apart, which will leave a space below the bottom rail of about 20 inches. Two furrows ploughed against the posts on each side, and the earth then thrown up with shovels, will nearly close this opening. The bank will stiffen the posts, so that they need not be set quite so deep; the ditch will assist the drainage, and the ditch and the bank will serve an important purpose, by preventing horses and colts from leaning and pressing against the rails, as they do not like the uneven surface of the ground.



Fig. 34.—RAILS SECURED TO POSTS.

If the rails are cut on purpose for such a fence, they may be about 14 feet long, and thus effect a slight saving in the number of posts, in the digging, and in bolts.

Farmers who now have common crooked rail fences of good sound rails, may use them for this purpose, and extend them more than three times the present length, as will be seen by inspecting fig. 11, showing by contrast the great number of rails



Fig. 32.

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TRANSPLANTING EVERGREENS.

When young evergreens have their branches spreading out down to the surface of the ground, as all evergreens should do to look well, it is often quite difficult to dig them up for transplanting, these spreading prostrate branches impeding the work of the spade. Again, when they are set out, the same difficulty occurs in placing them properly in the hole, and filling in the earth. Having recently had occasion to set out a large number from the nursery rows, we found the work could not only be much better done, but in about half the time, by drawing the lower branches upwards, pressing them against the tree, and securing them in this position by passing around and tying a cord, as shown in fig. 2, the common appearance of the tree



Fig. 1.—Tree before digging.

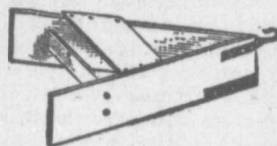


Fig. 2.—Tree dug up.

being represented by fig. 1. The ease with which the operator could now work was remarkable. Nurserymen, who have many such trees to dig, would find it to their advantage to provide a number of small straps to buckle around the trees during the operation of removal.

SNOW-PLOUGH.

The deep snow throughout the country the past winter made a great deal of hard labour in shovelling by hand. A simple snow-plough may be made by any farmer in an hour or two, and will open paths by means of a single horse, with ease and rapidity. The height of a plough may vary with the depth of the snow, which being very uncertain, it should be sufficient. A foot will answer for nearly all cases. Take two pieces of plank or thick board a foot wide and about five feet long, more or less, dress off one end of each in a wedge form on one side, so that when these two dressed faces are placed together, the two pieces will diverge like a letter >. A width of three feet behind will be usually sufficient, and a board may be placed within, extending across so as to form a brace by nailing. Sometimes a joint is made at the forward end, and crosspieces of different lengths keyed in to make the plough wider or narrower as may be desired. A hook is attached to the forward end for the whiffletree, and a box seat placed on the top for the driver. By increasing or diminishing the distance between the hook and whiffletree, the forward end will run high or low as the nature of the snows may require. The driver has only to keep the horse in the right place, slightly guiding the plough by throwing his weight left or right. This plough may be used around the house, to front gate, to barns and other outbuildings, along village streets and elsewhere. A finishing touch may be given to these paths by hand when desirable.



Snow-plough.

DRAWING OUT OLD POSTS.

The common way is to dig away the earth for a foot or two downward, and then pass a chain around the post and around a stout rail or a large lever, which is used for drawing out the post. This mode is slow. A more easy and rapid one, using ox power instead of human strength, which has long been in use in some places, is to attach a sufficient amount of chain to the oxen at one end and to the post at the other; place a stout prop between, with its top inclining towards the post, and then let the animals draw.



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Fig. 32.

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## WHEAT GROWING.

The requisites for success in the cultivation of wheat naturally divide themselves under four heads :

1. A good and suitable soil.
2. The best varieties of wheat.
3. Preparing the soil, sowing, and general management.
4. Avoiding diseases, insects, and other disasters.

### SOILS.

There are certain districts of the country widely known and celebrated as being excellent wheat regions ; and there are others where it is supposed wheat cannot be profitably grown. There is no question that the common belief that the wheat crop is not adapted to certain places, has been at least partly owing to bad management. When the country was new and the soil fresh and productive, good crops were obtained with but little difficulty. General success led to carelessness ; grain was sown after grain, without regard to proper rotation, and the soil became gradually exhausted, and filled with weeds. This pernicious course was much practised in the best wheat regions of Ontario, and the crops became so reduced that some went so far as to predict the entire failure of wheat-raising. But by the adoption of underdraining, cleansing, rotations, and enriching by clover, and a judicious application of manure, may again be obtained a gradual increase in successive years, until the original amount yielded by the new, fresh, and rich soil has been exceeded. It is a common opinion that the best wheat soils are those which contain a large portion of clay—commonly designated as *strong* soils. This is true to a great extent, but such soils nearly always require regular underdraining. It is obvious where the whole field has to get rid of its surplus water by the slow process of soaking away through the particles from one side of the field to the other, or by the equally slow process of evaporation, a fatal loss of time must often result—all of which is obviated by providing artificial means for a swift discharge in twenty-four hours of time, through regular channels of tile. Winter killing is obviated, manure is made accessible to the plant, and a deep mellow soil takes the place of the heavy, water-soaked or baked earth of the undrained farm. (Figs. 1 and 2.) Although light soils do not usually produce the heaviest yield of grain, yet the facility with which they are improved by rotation and clover, give them some advantages—so that, on the whole, more depends on good and proper management and adapting the system to the peculiarities of the soil.

### VARIETIES.

In SPRING WHEATS the *Club*, *Golden Drop*, and *Rio Grande*, have all had their day, and have been at times the favourites, but the necessity for constant change of seed caused by the deterioration in time of the best varieties has driven, or is driving, them out of choice. *Egyptian*, introduced a few years since with a great flourish of trumpets, has not been a success. *Farrow* and *Red Fern* are both good yielders, and safe, hardy wheats, but inferior in colour of berry. *Lost Nation* has given good satisfaction during the past year, especially in the lower provinces. The *White Russian* is probably the best spring wheat at present in the market. It yields well, has a splendid straw, is hardy, and so far as we have heard free from rust. The *White Fife*, has a very nice kernel, and is well spoken of.

In FALL WHEATS *Seneca* or *Clawson* has probably given the best satisfaction, and we can highly recommend it. The *Silver Chaff* is also very highly spoken of by those who have grown it. The *Scott*, *Golden Medal*, *Victor*, *White Midgproof*, and *Red Chaff*, all have their friends who recommend them.

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change of character, and hence the importance of continually selecting the best for sowing. There are various modes of making the selection. A good one is to pass through the field just before cutting and select the largest, best and ripest heads; sow the grain from these, and repeat the process annually. Another is to provide a special screen for the fanning mill, which shall allow all the grain to pass through except the largest and plumpest. Another mode is to throw the wheat by hand—across the barn floor—the largest grains will be thrown the farthest, and thus separated from the rest.

It is equally important to clean out foul seed. The late improvements in the fanning mill are such as to accomplish this result without much difficulty. Some farmers clean out the chaff and some other seeds by floating them on brine made just strong enough to effect the purpose and allow the wheat to sink—pouring off the floating matter and allowing the wheat to remain. The brine, which should be strong enough to float a potato, may be used several times. It is an old practice, successful to a considerable extent, to blow out the light seed, whether of weeds or the shrivelled wheat grains, by removing the shaking-rod from a fanning mill, so that the fan may be driven with greater velocity, taking out the unnecessary sieves, but allowing the lower one or screen to remain. One person turns the fan rapidly, while another regulates the discharge at the hopper. All the lighter stuff is blown out behind, and small, heavy seeds, like those of cockle, drop through the screen into the box below. Confining the blast from the fan by means of a large square board box or tube, assists in performing the operation with greater ease and efficiency.

PREPARATION OF THE SOIL—ROTATION.

For the purpose of bringing the soil up to a proper condition, and maintaining it in a proper state, and free from weeds, nothing is more important than a well-planned rotation, including at least one hoed crop. The following courses have been adopted in the best wheat districts of Western New York:—

COURSE FOR A STRONG, FERTILE SOIL.

- 1st year—Corn on clover sod.
- 2nd year—Oats on barley.
- 3rd year—Wheat.
- 4th year—Clover, mowed and cropped for seed.

This, it will be seen, is a four-course system, and is adapted to farming where raising crops is the principal object, and where there is a portion of permanent pasture on moist land. If the whole farm is well drained, a five year rotation may be adopted by seeding to both timothy and clover after the wheat, and by one year of pasturage after the mowing. It is important that the corn be kept well cultivated and perfectly clean. This will serve to eradicate such weeds as obtain a foothold in fields kept several years in grass, or in grass and sowed crops alternately. It is also important that one good crop of clover be ploughed in during the course, in order to maintain fertility.

On soils not quite so strong as the preceding, or where it is desirable to increase the fertility, the following course would be better:—

- 1st year—Corn on sod.



Fig. 1.—Wheat on Undrained Land—Growth Feeble—a, Top Soil, mostly Dry; b, Water Soaked Soil; c, Wet Subsoil.



Fig. 2.—Wheat on Drained, Land, of Strong Growth, the Water being Three Feet Down and below the Roots.



2nd year—Barley, followed by clover not cut or pastured.

3rd year—Clover ploughed under when full-grown, the sod rolled flat, pulverised with a two-horse cultivator, and sown with wheat.

4th year—Wheat.

5th year—Clover meadow.

6th year—Pasture.

It will be seen that only two tillage crops are allowed in succession, and that two green crops are ploughed under during the course. This system allows the feeding of a considerable number of animals and the consequent manufacture of manure—the application of which to the corn or to the wheat, as may be required, in addition to the green crops, will maintain almost any soil in a condition for raising good crops of wheat.

It was formerly a practice in some of the best wheat districts to take off a crop of wheat and plough under a crop of clover every alternate year—thus forming a two-course system, with an enriching crop every second year. This appeared to do well for a time, but as there was no hoed crop, the ground often became infested with foul weeds, and a greater variety was found better, not only for the land, but for the purposes of a general mixed husbandry. It is a common opinion that oats after corn, and preceding the wheat, is more exhausting to the soil, and less favourable to the wheat than barley; but some successful managers think this difference is entirely owing to the profusion of young plants which spring up from the oats scattered at harvesting. These crowd the wheat like weeds and diminish its vigour until the oats is winter killed. Different expedients are therefore resorted to, to prevent this autumn growth. One is to turn in a large herd of swine as soon as the crop of oats is removed. Another, applicable only to moist seasons, is to harrow well the whole surface, so as to cause the oats to germinate before ploughing under for the wheat. The harrowing will render the ploughing more complete and perfect by the pulverization thus effected. A third method is to plough under the scattered oats with very shallow furrows, and after they have come up, to turn the whole under by deeper ploughing preparatory to sowing the wheat. A fourth, and perhaps the best of all, is to plough first the whole field of oats stubble by what is termed the cut-and-cover process—the furrows being twenty inches or two feet apart, throwing out enough earth to cover the unmoved strip of ground a foot or more in width on the right hand of the plough. A good two-horse team will plough in this manner several acres a day. The whole is then harrowed, and unless the soil is extremely dry, the scattered seed will nearly all come up in a few days. It is then ploughed under, under the wheat sown.

**SUMMER FALLOWING.**—This practice is unnecessary in the rotation already described, if the soil is clean and in good condition—in which case a summer crop of barley, oats, spring wheat, or peas may occupy the ground that would otherwise be idle. But if the land contains many weeds or is hard and requires thorough pulverizations, summer fallowing, with two or three good ploughings, and twice or thrice as many harrowings, produces an excellent effect.

**MANURES.**—The wheat crop needs a large supply of nitrogen, and such manures, therefore, as contain ammonia largely are the best. Stable manure, from animals fed on grain, or yard manure from cattle fed on clover or oil-cake, prove very efficient applications and much better than manure from straw-fed animals only. The application of a few bushels of salt per acre, although varying in its results, has generally proved beneficial by increasing the amount a few bushels. On some soils it has had no beneficial effect.

**MANURING THE SURFACE.**—There are very few soils where the crop is not greatly benefited by top-dressing with manure after ploughing, and before the wheat is sown. The amount required for this purpose need not be so great as the usual application in manuring. It should, however, vary with the previous richness of the soil. If already quite rich, a thin dressing, just sufficient to give the young clover a good start, will be enough. On poorer soils, ten or twenty two-horse loads will not be too much. It should be evenly or uniformly spread, and for this reason old or fine manure is commonly preferred.

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**PREPARING OLD SOD.**—In portions where the land is hardly rich enough for the course already described, good crops of wheat have been raised by planting on the inverted sod of old pastures. It is performed in the following manner:—The sod is first turned over evenly and uniformly to a good depth.

The furrow slices should be laid flat and not lap. A roller is then passed over the whole, and the inverted surface made mellow by the use of a two-horse wheel cultivator. There may be conditions of the soil that would obviate the necessity of rolling—such, for example, as a heavy or clayey nature and a moist situation. If the succeeding summer should happen to be quite wet, the omission of rolling would afford partial underdrainage, but it would be better not to sow at all on land inclining to be wet, or which would not bear thorough rolling. As soon as the rolling is completed, top-dress the whole surface with fifteen or twenty loads of manure, and spread it evenly and perfectly. If the soil is rather light in character, it is important that this top-dressing be applied before the cultivating is given. If on the other hand it is quite strong or clayey, it will be as well to apply at least a part of it after the surface is pulverised, or even after the sowing of the seed, as it will thus protect the surface and tend to keep it from crusting.

**DEPTH OF SOWING.**—In a light, loose soil the depth may be greater than in one more heavy and compact. A greater depth is required during a time of severe drought than when the soil had a good supply of moisture. As a general average, a depth of two inches is enough. One inch would be better if the soil were sufficiently moist; but it is difficult to get a drill so as to deposit the seed uniformly so shallow. Some years ago the writer of this article performed a number of experiments with the following results—the depth being carefully measured, and the soil laid on the seed wheat in an even stratum :

Planted	$\frac{1}{2}$ inch deep,	the plant came up in	5 days.
Do	1 do	do	6 do.
Do	2 do	do	7 do.
Do	3 do	do	8 do.
Do	4 do	do	10 do.
Do	6 do	do	12 do.

Five weeks afterwards there was no perceptible difference in that planted half an inch and an inch deep; that planted two inches deep was not quite so good, so on, decreasing in quality as the depth of planting increased. At six inches there were but very few slender stalks. As the crop approaches maturity the difference between the shallow and deep planting becomes less obvious—so that one inch and three inch planting are not greatly different in their results, although the deeper planting is a little later in ripening, and is hardly so productive. For this reason wheat planted with a good drill on well prepared and rolled ground, where it may be put in with great evenness, ripens more uniformly, and brings a rather better return than wheat sown broadcast and covered with an harrow at all different depths. For the same reason twenty-five per cent. in seed is saved by using the drill. That is, a bushel and a half per acre will answer the same purpose, if properly drilled in, as two bushels sown broadcast and harrowed.

**HARROWING IN SPRING.**—The practice of harrowing the whole surface of the field early in spring, although adopted by some farmers many years ago, has not come into general use, and yet it has always been attended with good results, provided the ground was sufficiently dry at the time and a light, fine tooth harrow was used for the purpose. Although the young plants of the wheat appear to be rather roughly treated, yet scarcely any are ever torn out or seriously injured. The breaking of the crust, mellowing the whole surface, and the destruction of small weeds, all of which are well known to be beneficial in all hoed crops, cannot fail to assist the growth of wheat. It also prepares the ground for the

Fig. 4.—Sections of Drills showing the Furrow.



Fig. 5.—Strong Growth of Young Stool-Sown Shallow.



Fig. 6.—Young Wheat Plant from Shallow Sowing, with strong roots.

reception of grass seed, which may be rolled in, and will be more likely to take than on a hard crust.

#### FALL WHEAT.

**WINTER-KILLING.**—On some soils and in some localities the destruction of the crop by freezing out, is a formidable drawback to the culture of this crop. Heavy, wet, or undrained lands are most liable. Nothing is better by way of prevention, therefore, than thorough underdraining. It has not only doubled or tripled the crop in many instances, but has effected an insurance against this disaster. Sometimes winter-killing occurs on dry land much exposed to sharp wind, and when little snow has fallen. Top-dressing with manure at the time of sowing, or on the first freezing of the soil in winter, has proved valuable. Even a thin coat of straw, just sufficient to break the force of cold winds, has had an excellent effect. An experiment occurred under the eye of the writer, where a portion of a field sown with Mediterranean wheat (which is more liable to be injured in this way than some other sorts), received a thin dressing of straw, the other part remaining exposed. Winter-killing was unusually severe that year, and the whole of the exposed portion was so fatally injured as to be not worth cutting, while the other part yielded about twenty bushels per acre.

Where heavy or wet land has not been underdrained, some protection is afforded by ploughing the ground into narrow "lands" or ridges eight or ten feet wide, and so laid that the furrows between them shall make the shortest discharge in the direction of the descent.

**TIME FOR HARVESTING.**—A general practice is to cut wheat too late, or when it is dead ripe, with the heads bent over and hanging downward. A better time is five or six days earlier, or before the heads droop much, or while the grain is in the dough state and the tips of the chaff are yet green. Careful experiments, in connection with accurate weighing,

performed by the writer, proved that wheat cut thus early was slightly heavier than when cut later, and millers stated that it made more and better flour for a given weight. The straw, if well dried, is better, brighter, and more valuable for feeding. It is true the straw is somewhat heavier, requires a little more labour and tight binding on account of shrinkage in drying; but these are overbalanced by the less amount of waste in the harvest field. Since the introduction of reapers the time is more completely at the control of the farmer, and the crop should be secured at least two or three days before the usual dead ripe period.

In regions where showers are frequent, it will be found most economical to insure a perfect condition of the grain by placing it in water-proof shocks as soon as cut. There

are two modes of making shocks—in a small round shape, and larger and oblong. The smaller ones made by placing six sheaves firmly on the ground, with the tops drawn closely and compactly together. A seventh is then bound very tightly near the butts and the straw broken down all around before placing it in an inverted position on the top of the shock. The straw of the cap is then spread evenly all around, and pressed against the tops of the sheaves within—forming a perfect covering against any rain, however heavy or long continued. The oblong shocks are made by placing ten sheaves in a double row, the opposite ones against each other. Two caps are then put upon each shock.

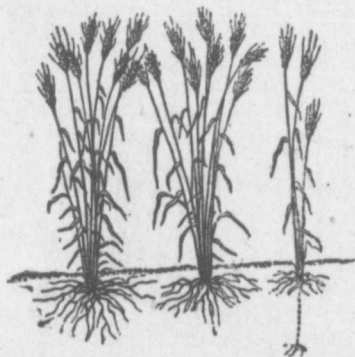


Fig. 8—Subsequent Effect of Deep Shallow Planting.



Fig. 7.—Young Wheat Plant from Deep Sowing, with feeble roots below, and striking new roots near the surface.

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SPRING WHEAT.

A good clover sod turned under in autumn and thoroughly mellowed, by means of a horse cultivator, in spring, is a good preparation; it also succeeds well on well pulverised soil after corn. A medium loam is found best; very light or very heavy clayey land not succeeding so well. The practices of sowing very early, so as to escape the midge, or quite late, so that it may ripen after the midge is passed, have both been adopted, but the early sowing has commonly done best.

DISEASE AND ENEMIES.

These may be classed under four different heads, namely:—1. Winter-killing. 2. Smut. 3. Rust. 4. Insects, including the Hessian fly and the midge—the chinch bug and some other insects have proved destructive in certain localities.

Remedies for winter-killing have been already pointed out; but it may be well to speak briefly of a pernicious weed which almost invariably springs up on winter-killed patches. This is chess, or cheat—*Bromus secalinus* of botanists. It is a very hardy plant, growing from a small, hardy seed. The plant when shaded by wheat is only a few inches high, bearing a few seed, and entirely unobserved by the farmer. But when the wheat is destroyed, the chess has all the space, and each plant springs up several feet high, bearing thousands of seeds. Plants have been found in shaded places only two inches high and re-producing seed; and again, when entirely unshaded, from three to five thousand grains have been counted on a single root. Nothing is therefore more natural than for careless and superficial cultivators to come to the conclusion that the wheat being partly killed, has changed to chess. But as the two plants belong to different genera, such a change is impossible. The seeds of chess, on account of their small size and hardness, are often scattered in the soil in manure, foul seed, droppings of animals, from itinerant thrashing machines, and in various other ways unperceived; but farmers who have taken special pains always to sow perfectly clean seed, have succeeded in a few years in eradicating the chess plant entirely from their farms.



Fig. 9.—Chess.

2. SMUT.—This is a fungus which takes possession of the grain and reduces it to a black powder. The microscopic seeds of this fungus plant become attached to the seed grain in large numbers, and ascend through the sap vessels of the growing plant, producing smut in the new heads. It is easily prevented by washing the seed wheat. If there is much smut the wheat should be first washed in water, which may be done in tubs by stirring the water and wheat together, pouring off the blackened liquid and adding fresh portions until it runs clear. Then wash in brine, spread on a barn floor, and dust with dry, powdered, water-slaked lime, stirring the whole together. If this seed is now sown, no smut will be re-produced from it. If the seed wheat is but slightly infested, the washing with water will not be necessary. A solution of blue vitriol has been found very efficient in destroying



Fig. 10.—Magnified View of Rust Plants, bursting open the skin of the straw—also Plants beneath skin unburst.

smut ; but in ordinary instances, brine answers the purpose. Smut is often carried from one farm to another by means of itinerant thrashing machines.



Fig. 11.—Magnified Wheat Straw marked with Rust.

3. RUST.—When slight, does little injury, but in its more severe or extensive attacks it covers both surfaces of the leaves, the stubble, straw and chaff, first imparting a yellowish, then a brown, and afterwards nearly a black, appearance. It is a small, microscopic plant or fungus, the seeds of which are distributed through the sap pores. These seeds produce young plants under the epidermis or skin of the wheat—which they swell and burst in longitudinal slits all over the plant. These little plants may be distinctly seen by means of a powerful microscope, in all stages of their development—from the numerous little round regular heads, seen beneath the transparent and unbroken epidermis, to the confused mass after they have broken through and scattered their fine powder over the whole surface. In favourable weather, and in good wheat fields, rust makes but little progress, and does little or no harm ; but when the weather suddenly becomes hot and moist, its attacks are often fatal to the crop. The growth of the grain is at once arrested, and if the crop is struck before the grain has formed, it will not be worth cutting. If partly formed it will be more or less injured. Wheat growing on low, wet, and mucky soil is generally more liable to rust than on hard upland, but cases not unfrequently occur when it appears in belts or streaks, in the direction of prevailing winds, blighting alike every field of wheat, whether high or low, in its track. The remedy for rust is sowing in dry or well drained soil, which is rich enough to push the crop on and cause it to ripen early, beyond the reach of its attacks. Early ripening varieties are best on this account.



Fig. 12.—Magnified Rust Plants attached to the Straw.



Fig. 13.—Highly Magnified Rust Plant.

## INSECTS WHICH ATTACK WHEAT.

**THE MIDGE**—In the perfect insect state, is a small two-winged fly, somewhat resembling a musquito, about one-third its size, and of a bright yellow colour. Early in summer it lays its eggs between the chaff of the newly-formed heads of wheat. The eggs hatch and produce small, bright, orange yellow worms or larvae, which, when fully grown in three or four weeks, are scarcely the tenth of an inch long. These minute insects, by their ravages have occasioned in the whole country a loss of hundreds of millions. The destruction is usually the greatest in moist seasons, as the flies only lay their eggs in a moist air, and cannot endure a dry one ; hence they are found at work chiefly in the night and on cloudy days. When the worms get their growth, they crawl down the straw when it is wet with rains, and form minute cocoons just beneath the surface, from which they emerge the next season in the fly state for reproduction. Many of the worms have not left the heads when the wheat is drawn in, and the straw



Fig. 14.—Wheat Midge Walking.

continuing dry



Fig. 15.—Wheat fly while another crop is growing and yielded a better crop than the best cultivated by every farmer.

### HESMAN FLY



Fig. 18.—The Hessian fly following spring.



Fig. 21.—Early stage of a wheat fly.

continuing dry, they remain until threshed out with the grain, from which separated in the fanning-mill, and in this state are well known to farmers, sometimes whole bushels being thus obtained in the screenings.



Fig. 15.—Wheat Midge, Flying.

They should be either burned or fed under shelter to pigs or poultry; if thrown out they will produce new swarms of flies. The best remedies for the ravages of the midge are the selection of such varieties of the wheat as are least affected by it, and such good culture and management generally, as will bring early and heavy crops. A badly drained field, unmanured and imperfectly cultivated, has in some cases been nearly or entirely destroyed by the midge; while another field alongside, well managed in every respect, has nearly escaped, and yielded a heavy crop. If the lesson which this insect teaches—namely, that the best cultivation only is attended with success—could be learned and adopted by every farmer, it would prove a blessing instead of a disaster.

Fig. 16. Wheat Eggs of Midge.



Fig. 17.—Wheat Chaffs Opened, showing the Worms on the Kernel.

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**HESSEAN FLY.**—(*Cecidomyia destructor*), as well as the midge (*Cecidomyia Triticæ*),



Fig. 18.—The Hessian Fly.

was imported from Europe, where both have proved more or less injurious to wheat. The perfect insect considerably resembles a common mosquito, but is a little smaller. It appears early in autumn, lays its minute reddish eggs on the upper side of the leaves, where they hatch, and the minute worms crawl down the sheaves until they reach the bottom of the pocket formed by the union of the sheath and straw. Here they suck the juice and injure its growth, often causing it to wither and die. In about six weeks it changes colour, much resembling at this time a small flat seed. The following spring it passes to the pupa state, and afterwards to the perfect fly, making its second or spring attack on the crop. The injuries of this insect are shown by the broken and half prostrate straws scattered through the wheat field before harvest.



Fig. 19.—Sheath torn off exposing the worm.



Fig. 21.—Barley and Joint-worm Fly.

The Hessian fly has been eluded by sowing the grain so late as to be beyond the reach of the autumn insects—although this lateness has proved detrimental by inducing liability to winter-killing and rust.

The best remedy, generally speaking, like that for the midge, is the production of strong, heavy crops by good general management.



Fig. 20.—Hessian Fly Larva.



THE JOINT WORM much resembles the Hessian fly in its mode of attack, but differs by occupying the substance of the sheath, straw or joint, producing hardened vegetable tumours—instead of merely resting between the sheath and straw, like the Hessian fly. As it remains in the straw through autumn and winter, it may be destroyed and its ravages lessened by burning the straw.



Fig. 22.—Grain Weevil.

THE GRAIN WEEVIL.—(*Calandra granaria*) deposits its eggs by boring a small hole into the grain, where it hatches, and the larva eats out the interior, leaving only the bran or shell. Kiln drying is recommended.

There are several other insects that occasionally prove destructive to wheat, but the preceding are the most formidable.

## MANAGEMENT OF HEDGES.

The traveller through all parts of the country, and especially in the Western States, is struck with the general bad management of hedges, with now and then some admirable exceptions. The failures are always owing to one or more of the following causes—frequently to all of them combined:—



Fig. 1.—Hedge Plant without Assorting, and before Cutting Back.

(fig. 1)—resulting in inequalities and gaps, as illustrated in the accompanying sketch (fig. 2.)

3. Want of the constant cultivation of a broad strip of mellow soil, at least four or five feet wide on each side of the hedge row, for the first three or four years at least, without which the growth will be slow and feeble, when it should be strong and vigorous.

4. Absence of thorough underdraining along the line of the hedge, without which the plants are lifted out by frost when young, or killed by severe winters when older.

5. Neglect of properly cutting back the hedge while forming, to give it a thick or dense bottom.

6. Want of good pruning, which may be entire neglect, or a broad, flat top and thin bottom.

A few additional remarks will be proper on some of these points. If the soil is well prepared, the young trees may be planted not only three times as fast as if badly pulverized, but they will be more certain to grow uniformly, and form a good and early hedge. Selecting and assorting plants is of great importance in preserving an even, uninterrupted and uniform barrier. The plants, before setting out, should be carefully assorted into two or three sizes, and all which are not plump, healthy, and

1. Bad preparation of the soil, which is soddy or clody, or otherwise badly pulverized.

2. Bad selection of plants,—intermixing large and small, half-dead and vigorous



Fig. 2.—Hedges a "Humbug."

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with good roots and well-formed buds, should be laid aside and tried another season in the seed bed. Let all the large ones be set in the row together, and the same care observed with the medium and the small ones (fig. 3). Those which are quite small should be kept in the seed bed for



Fig. 3.—Hedge of Assorted Plants not yet Cut Back.

another year, especially if the roots are imperfect. We need scarcely add anything on the importance of cultivation to those who know that young trees as well as a row of corn, cannot flourish or make any growth without the soil is well cultivated, the difficulty with too many is that they cultivate a strip much too narrow or only two or three feet entire width, when it ought to be not less than eight or ten feet wide. Young trees send off roots on each side about as far as the height of the tree, and a young hedge, the shoots of which grow four or five feet high, will therefore have an extent of roots from tip to tip, of not less than eight or ten feet, the whole surface above which should be kept clean and mellow (fig. 4). If the soil is rich, the cultivation may be suspended after midsummer to allow the new wood to ripen. Planting the hedge row within a few feet of a good tile drain is an excellent practice, unless the subsoil has

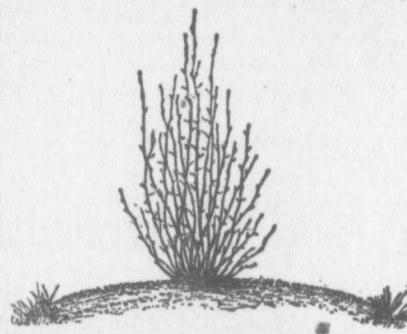


Fig. 4.—End View of Young Hedge well Cultivated.

so good a natural drainage that the water will not stand twenty-four hours in a post-hole on the wettest day in spring. This thorough drainage not only prevents the young plants from being thrown out by frost, but contributes greatly to the hardiness of the trees in subsequent years. We have known hedges to endure the severest winters when placed over or near a tile drain, while others similarly situated, but without drainage, were killed down to the ground. There is nothing that is more difficult than to induce novices to cut back the plants sufficiently. When set out they should be headed down within an inch or two of the ground, which will make the new shoots spring up vigorously, while without it, the growth will be comparatively feeble. When the plants are fairly started, they should be left to grow about two years undisturbed—in the rich soils of the West one year may do—so that they may become strong and obtain a good foothold in the soil. The process of heading down should then commence, and be continued twice a year until the hedge is formed, which will be in two or three years more. The first cutting back should be within three inches of the ground; the next, four or five inches higher, and so on, increasing gradually for each successive cutting. This cutting back is commonly neglected, and the plants run up in a slender and meagre form, thin at the bottom, and heavy at the top. In order to keep the hedge thick below, the common error should also be avoided of shearing broad and flat the top, as shown in fig. 5, which leaves the bottom meagre and open. It should also be shaped to a sharp edge or peak, like fig. 6, which represents a perfect and successful hedge.



Fig. 5.—Badly Trimmed Hedge.

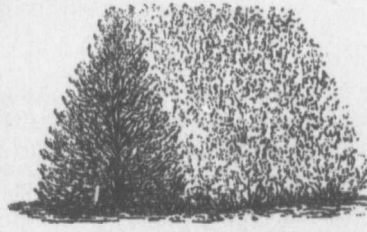


Fig. 6.—“Hedge a Success.”

It happens fortunately that hedge rows which have been thus neglected may still, by proper management, be made into good barriers. Twelve years ago we had an osage hedge set out on a tenant farm too far off for proper superintendence. A tile drain was placed within a few feet,

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Fig. 7.—Hedge allowed to grow without cutting back, as seen in winter.

cut the trees back sufficiently. He thought it looked like "ruin" to cut down young trees which had grown five or six feet high, to within as many inches of the ground; and although in a few years it formed a good fence against cattle, it had numerous gaps below, and would not exclude small animals. (fig. 7). A year ago it had grown about ten feet high, when we directed it to be laid. This was done by one person taking a sharp axe and cutting the stems—which were now about an inch and a half in diameter—one half off, as near to the ground as practicable. When this was done, another person with a pitchfork bent the trees over



Fig. 8.—The same "Laid," or Prostrated by Cutting the Stem half off near the ground.

in an inclined and nearly prostrate position, in an accurate line along the hedge row. (Fig. 8). If the branches of any of the trees were too broad, they were clipped or cut off with an axe. When this operation was completed, a new hedge had been formed consisting of the inclined trees, which should form an angle of about thirty degrees with the horizon. If the trees are quite bushy or spreading, it will be best to give the axe a long handle, so that the operator may do the work without fear of being scratched by the thorns; and the trees may be bent over more readily and accurately if two men with their pitchforks stand on opposite sides of the hedge. In the course of the season new shoots will spring up from the stubs and stems, and grow several feet high, and thus interlacing the old stems and

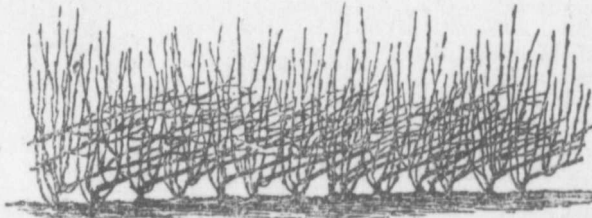


Fig. 9.—The same after one year's new growth.

branches, will form a new hedge (fig. 9) of such strength that the most furious bull cannot enter it. It is important that the cutting back be done quite early in spring, and before the buds have begun to expand. If left until later, or after growth has commenced, or when the buds are opening, a serious check will be given to the trees, and they will make but few and feeble shoots. The course thus described is well adapted to a farm hedge, and has the advantage that it continues to be a good barrier even immediately after the cutting down has been performed. Another mode of renewing an old hedge is to cut the trees down within a few inches of the ground, and thus allow an entirely new growth to spring up; a year or two being thus required for the new hedge to form, it is not so well adapted to general purposes, but is well suited to door-yard boundaries as a neater growth may be thus obtained by the removal of all the old brush. If the cutting down is done early in spring, this second growth will be strong and rapid, and the new hedge may be made in less time than by setting out young plants.

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It is necessary for the Natural History of all pass through quite different other states. In the young state, when the insect is in a dormant state, it is called a miller or the lil

To render the insect well to first prevent some insect, during its life, when it is in a dormant state, for instance, will be in a dormant state, in case of each of these purposes we will prevent insects, the

This insect is it being the parent, it is termed, though "maggot," which

In June, as soon as the flies are several inches high, the flies are ready to deposit their eggs, and the eggs are usually

The eggs or "maggots" are deposited on the edge of the sheaf, and are placed around the main stem, slightly above where the sheaf is placed upon parterre, and are perceptible to the touch.

The minute worms which are deposited on the track till it reaches the ground, and only the thin outer portion of the sheaf is affected, and usually the onion. Therefore, the onion, when in contact with it, it will be injured. But if no onion is present, the worms themselves, each feeding on another onion, will guide him to the onion.

The first indication of the enemy, we discover, is when the young plants are turned to a yellow colour.



## GARDEN INSECTS.

BY ASA FITCH, M.D.

It is necessary to apprise those who are not already somewhat conversant with the Natural History of insects, that this class of animals with but few exceptions, all pass through four distinct stages of life, in each of which the same species is quite different in its external form, and also in its habits, from what it is in its other states. These stages are, first the *egg*, which is succeeded by the *larva* or growing state, when it is commonly a worm, grub or caterpillar, followed by the *pupa* or dormant state, and finally the *perfect* or winged state, when it is a fly, beetle, miller or the like.

To render the subject more distinct and familiar, it will be well to first present a somewhat full and particular account of some insect, describing its appearance and habits in each stage of its life, whereby the reader, without a similar recital in every instance, will be aware that something analagous occurs in the case of each of the other insects which we mention. For this purpose we will select one of the most important of our garden insects, the

## ONION-FLY.

This insect is one of the most pernicious pests in our gardens, it being the parent of the white "grub" as it is frequently termed, though as it has no distinct head, it is more properly a "maggot," which bores into and destroys the root of the onion.

In June, as soon as the young seeding onions are some two inches high, the maggot begins to infest them, and continues through the whole season, one generation after another getting its growth and coming out in its perfect state, whereby some of the flies are liable to be always present in the garden, in readiness to deposit their eggs, and maggots of widely different sizes are usually found together in the same onion.

The eggs or "fly-blows," loosely placed upon the onion slightly above the surface of the ground, as shown in figure 1, some of them being dropped along the thin edge of the sheath or collar, which is formed by the base of the lower leaf clasping around the main stock, and others are crowded into the crevices between the leaves slightly above where they issue from this sheath. From two to six or more eggs are placed upon particular plants, scattered here and there through the bed. They are perceptible to the eye, being white, smooth and oval.

The minute worm or larva which hatches from each egg, eats its way downward inside of the sheath, its course being marked by a discoloured track till it reaches the roots, on which it feeds till it is wholly consumed, only the thin outer skin remaining. A small young onion furnishes but a portion of the nourishment which one worm requires for its growth, and usually there are several worms feeding together upon the same onion. Therefore, when it is consumed, if there is another onion growing in contact with the first, or nearly so, they readily discover and invade it. But if no onion is growing near the first, they are obliged to scatter themselves, each crawling about in the ground until he chances to come to another onion, or to one of its slender rootlets, which will serve to guide him to the thick root from which it issues.

The first indication we have that our onion bed is invaded by this enemy, we discover a vacancy in one of the rows, where two, three or more of the young plants are withered and lying flat upon the surface of the ground and faded to a yellow colour. And the plant next to these prostrate ones, probably has its



Fig. 1.—Young Onion, with Eggs, a Maggot Feeding, and the root cut asunder by it.



Fig. 2.—Worms of the Onion-Fly.

outer leaf similarly wilted and drooping, as indicated in fig. 1, though retaining its green colour, while its other leaves are erect, and appear perfectly healthy; but on feeling them we find they are soft and flaccid, not stiff and firm like the leaves of the unaffected plants. Thus by feeling the leaves we can readily detect those plants which have worms present in the roots.

On examining the roots we find the operations of the worm vary more or less in different instances. Sometimes a round hole is bored either in the side or the bottom of the onion, and only one worm is present. More commonly several worms of different sizes are found, and if the root is small and cylindrical, it is cut completely asunder, as represented in fig. 1; if it is larger, and beginning to swell out into a round bulb as in fig. 3, we commonly find an orifice opening into an irregular cavity in the centre, and the earth around this orifice is wet and slimy, forming a mass of filthy mud, in which the worms are lying when not engaged in feeding. All of the root from being thus perforated and gnawed, soon perishes and becomes soft and putrid, except its bottom part, which, continuing to be nourished by the thread-like rootlets, remains sound, and the worms thereupon crowd themselves into this part to feed, whereby it sometimes presents the appearance represented in fig. 4, being thronged with worms wedged together side by side in a compact mass, all with their heads downwards, eagerly consuming the last remains of food they are able to obtain there, and only the rounded hind ends of the bodies exposed to view, and forming an even surface analagous to the cobble stones of a street pavement.

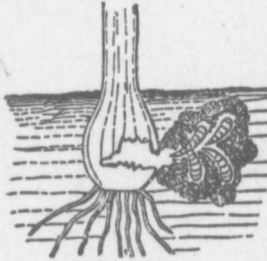


Fig. 3.—Vertical Section of a Diseased Onion and the mass of muddy slime beside it.

Multipliers, escallions, and old onions, set out for raising seed, are about as liable to be attacked as are the small seedling plants. And in some cases there would seem to be something peculiar in particular onions, which attracts these insects to them in prodigious numbers. Thus an escallion a few weeks after it was planted out, having wilted and turned yellow, its root was found on examination to be a putrid mass of a most offensive smell, and everywhere thronged with these maggots of all sizes. I judged there was at least two hundred of them in this root, which was little more than half an inch thick. And though there was no sustenance remaining for them, unless they feed on the putrid as well as the sound substance of the onion, every crevice above the ground around the bases of the leaves was occupied with eggs recently laid, to the number of nearly fifty.



Fig. 4.—Bottom of an onion crowded with maggots feeding downwards.

The larva is dull, white and shining, soft, and flesh-like, cylindrical and tapering to a point at its forward end when at rest, more tapering when it is elongated in crawling. Frequently a pale brown movable streak or cloud, produced by internal alimentary matter, is seen on the hind part of its back. Its hind end is cut off obliquely, forming a flattened surface, on which, slightly above the centre, are two elevated dots of a cinnamon yellow colour, and appearing somewhat like a pair of eyes. And around the margin are eight small projecting teeth of which the two lowest ones are largest, and a little forward of these, on the under side, are two additional teeth, like minute feet, by the aid of which the maggot shoves itself forward when crawling.

The larva grows to its full size in about a fortnight after it hatches from the eggs, and is then so plump and gorged with food, and its skin so distended and glossy, that it appears to be too obese and lazy, in many instances, to exert itself sufficiently to make its way out of the onion, and accordingly composes itself to rest there during its pupa state. But as it is liable to be disturbed by other maggots moving around and rubbing against it if it remains inside of the onion, it more frequently crawls out into the wet slimy earth which is in contact with the root. It then refrains from any motion, and gradually becomes contracted and shorter in its length, its skin grows hard and leathery, and changes to a tarnished yellow, and finally to a chestnut colour, with a stain of black at each end. It is now in its pupa state, ts

hardened out from it, the wings and legs

The insect two weeks, when it is come from it a full are placed side form. It is beneath showing their eyes, with the whole sun they are small in the cut.

These flies head silvery eyes, which is and brown or forked hind end gnawed from a row of black body, which showing a continuous spots are very faintly perceived

At the close will be lying in order to complete Other larvae near where they being little or nothing when they are are liable to be

Many persons of this enemy the crop, we following year upon some ren where there is will probably

As it requires got till it attain contact with enabling it to rest are grown into other vegetation each marked being about them in none of them when the plants small maggots wander away underground, with other hills. It managed would

When we see we know that his career, even probably be de

hardened outward skin forming a pod or case, inside of which, and wholly separated from it, the real pupa lies, very white and soft, and showing on its surface, the wings and legs of the future fly in this rudimentary state.

The insect now remains motionless and asleep as it were, in its pupa state about two weeks, the time varying, being shorter when the weather is hot and longer when it is cool. It then breaks open the hard outer shell-like case and comes out from it a fully formed fly, similar to the common horse-fly, though when the two are placed side by side you see this is considerably smaller and more slender in its form. It is represented, in the accompanying cut (fig. 5), the cross lines underneath showing its natural dimensions. The two sexes are readily distinguished by their eyes, which in the males are close together, and so large as to occupy almost the whole surface of the head, whilst in the females they are smaller and widely separated, as shown in the cut.

These flies are of an ashy-gray colour with the head silvery white, and a stripe between the eyes, which is narrow and black in the male, broad and brown or rust colour in the female, with its forked hind end black. It is particularly distinguished from other species, by having in the males a row of black spots along the middle of the hind body, which sometimes run into each other, forming a continuous stripe, whilst in the females these spots are wanting or in some instances are very faintly perceived.



Fig. 5.—Onion Fly.

At the close of the season some of the pupæ and probably some of the larvæ also, will be lying in the soil of the onion bed, where they will remain through the winter to complete their transformations, and give out the flies the following spring. Other larvæ nestled in the onions are liable to be taken unobserved into the cellar, where they become nearly torpid with the coolness of the temperature there, making little or no advance during the whole winter, and will be found in the onions when they are removed from the cellar the following spring. Thus these maggots are liable to be present in the onions the whole year round.

Many persons have for a time abandoned the growing of onions in consequence of this enemy; and where it is present in such force as to nearly or quite destroy the crop, we may confidently expect it will be numerous in the same grounds the following year. I have thought in such cases, a farmer by making an onion bed upon some remote part of his lands, where none of these flies will be present, and where there is no garden so near that they will from thence readily find the spot, will probably obtain a crop uninjured by this insect.

As it requires several onions when they are young and small to nourish one maggot till it attains its growth, it is obvious our mode of cultivating onions in close contact with each other, in rows in a bed, accommodates this insect perfectly, enabling it to readily find the amount of food it requires. If instead of this the onions are grown insulated and widely apart, in hills scattered here and there among the other vegetation in the garden, with but three or four plants in a hill—the hills each marked by a stake, that they may not be overlooked and destroyed when hoeing about them—some of these hills will probably escape discovery by the flies; and in none of them can a maggot obtain sufficient sustenance to grow to maturity, when the plants are young. After consuming all the food there, the half dozen small maggots that will be usually hatched in each hill that a fly has visited, will wander away in search of sustenance elsewhere, and crawling round at random underground, will probably perish of hunger before they will chance to find any of the other hills. It would seem that, during the early part of the season, a garden thus managed would become wholly free from these insects.

When we see the leaves of a young onion wilted and lying flat upon the ground, we know that this enemy is at work in that spot, and that unless he is arrested in his career, every plant in the row, for a distance of twelve or eighteen inches, will probably be destroyed before his operations will terminate. It therefore becomes



an important question how this calamity can be averted. Before another day the adjoining plants will be invaded. Some step, the efficacy of which is certain, requires to be promptly taken. Very few of the numerous remedies for destroying the maggot of the onion fly, which have been made public in our agricultural periodicals, have I regarded as of sufficient promise to be worthy of a trial, and some of this few which I have tested have proved to be worthless. My own practice has been to search out every plant having any of these maggots in its roots—every plant, the leaves of which were wilted and drooping, or felt soft and flaccid, and dig down by the side of it sufficiently deep to raise it from the ground entire. These uprooted plants, and any maggots which I come to in the earth around them, I usually place in a tight box or basin, which I usually set aside, and let the plants wither and the worms in them perish. Even should there chance to be any pupæ in the uprooted plants, they would be unable to complete their transformations when thus treated, for on being taken from the moist ground and exposed to the air, I find the soft, white pupa which is lying inside of the hard outer shell-like case, dries away and perishes within twenty-four hours. In this manner, the destructive career of this insect in the onion bed, is immediately arrested. And this uprooting of the infested plants and destroying the larvæ in them, is the only certain and efficacious remedy for this pest which is known to us.

I have been the more particular in giving a somewhat full history of the onion-fly, as some of the most important insects infesting other garden roots, pertain to the same genus *Anthomyia*. These are so closely like this onion-fly, both in their appearance and habits, that little more will now be necessary than to state the few particulars wherein they differ from it.

Before we pass to consider the insects of other garden roots, another common disaster to the onion, to which I find no published allusion, requires to be noticed. During the latter part of June, and in July and August, one onion after another in the bed, ceases to grow, and its top gradually becomes dead and dry, although the bulb is perfectly sound and hard—the plant thus terminating its growth for the season, when the bulb is sometimes no larger than a walnut. Upon raising such onions from the ground, we find they come up very easily, having lost their attachment to the soil by reason of a malady that has affected their small fibrous rootlets, which for the most part are severed from their connection with the bottom of the bulb, whilst other are withered, dry and discoloured, very few if any of these rootlets remaining white, succulent and in a healthy condition, capable of contributing to the nourishment and sustentation of the plant. And adhering to the bottom of the onion will sometimes be seen one or more small young

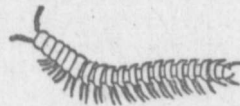


Fig. 6.—Centipede.

#### CENTIPEDES,

or "Thousand-legged-worms," whilst several others of them may be noticed in the hole from which the bulb has been raised. It is these creatures that are the authors of the mischief—wholly cutting off many, and in some instances, all of the rootlets, and wounding and girdling others to such an extent that they wither and perish. These worms will be described when we come to consider the insects injuring the roots of the cabbage.

§ The beet is quite free from insect enemies. The only one entitled to notice is the

#### STRIPED BLISTERING FLY,

*Cantharis vittata*, a cylindrical beetle scarcely the thickness of a small lead pencil, and half an inch or more long, of a dull, pale, yellowish colour, with two black stripes on its fore body and on each of its wing covers. These beetles occasionally appear in immense numbers, attacking the potato-tops and stripping them bare of their leaves. They are equally fond of the leaves of the beet, which are liable to be totally consumed in places where this insect is present. The only remedy is to gather the beetles in pans or covered tin pails, and kill them by sinking the pail in boiling water—when they may be dried and sold to the apothecaries, every intelli-

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The carrot and also the parsnip are but little depredated upon by insects. The

#### NEGRO-FLY,

*Psila Rosæ*, which produces a yellow maggot that bores the root of the carrot in Europe, and is its worst enemy, has not yet reached this side of the Atlantic, that I am aware. The leaves of both the vegetables named, and also those of the carrot and parsley, are eaten by a large, thick-bodied apple-green worm (fig. 7), prettily marked with black bands, each band being formed in part by six equidistant yellow spots. Some of these worms are seen in our gardens almost every year on one or the other of the plants named, though the species subsist mostly upon the wild parsnip growing in the meadows and along highway fences. In its pupa state it is curiously held to the side of a post or the wall of an out-building, by a thread passed around the upper part of its body. It finally becomes a beautiful large black butterfly, having two rows of yellow black spots beyond the middle of its wings, and on the hind pair a row of blue spots between the yellow ones. This is named the Asterias Butterfly, *Papilio Asterias*. It may every year be noticed in the garden gently hovering over one of the above named plants, and settling for a few seconds on the ends of one leaf after another, placing a single egg on the upper side of the leaf. There are two broods each year, the worms appearing early in July and again in August. They may be picked off the leaves and killed, though they are seldom if ever so numerous as to require their destruction.



Fig. 7.—Parsnip and Parsley Worm.

The radish has its leaves perforated with small holes by the

#### STRIPED FLEA-BEETLE

(fig. 8) which infest the cabbage leaves, under which head it will be more particularly noticed. Altogether the worst enemy of this vegetable is the larva of the Radish fly, *Anthomyia Raphana*, as it is named by Dr. Harris, although it appears to be identical in every particular with the European *Anthomyia radicum*. This larva is a maggot which gnaws irregular spots on the outer surface of the radish, and bores long, winding, yellow worm-tracks in the white interior of the root, whereby it becomes tough and stringy, and unfit for the table. A large portion of the radishes grown in most of our gardens, are hereby rendered worthless, every year, and many persons never attempt to raise this vegetable in consequence of this insect. It is only my earliest sown bed from which I obtain a few radishes that are eatable, and some years this first sowing is a total failure like the later ones. The worm and also the pupa differ in no respect, that I perceive, from those of the onion-fly, except that at the hind end the two larger middle teeth upon the underside are slightly notched at their tips, and two-toothed instead of tapering to a single sharp point. The flies, too, are very similar, but in this radish-fly three faint brownish stripes are perceptible on the fore body, and on the hind body in the male is a black stripe along the middle, which is crossed by narrower blank lines on each of the sutures.



Fig. 8.—Striped Flea Beetle.

The cabbage appears to be attacked by a greater number of insects than any other garden vegetable, and suffers more severely from these pests than any other plant, the cucumber, perhaps, excepted. Its roots, its stalks, and its leaves each have their particular depredators. These we will proceed to consider in their successive order.

The root frequently has its surface excoiated and its interior bored by the larva of the

#### CABBAGE-FLY,

*Anthomia Brassicæ*. This maggot commences its attacks when the plants are small, even before they are taken from the seed bed, sometimes destroying every plant in the bed. It continues to infest the roots through the whole season. At the time

of gathering the cabbages in autumn, I can always obtain specimens of these larvæ, finding them burrowed in little cavities in the bark of the root or sometimes boring directly inward with the white ends of their bodies projecting out from the surface. They prey severely upon the cauliflower and other tender varieties of the cabbage. The larvæ appear to differ in no respect from those of the Radish fly. The flattened hind end of their bodies have twelve minute teeth around the margin, whereof the two lowermost ones are largest, with their ends notched and two-toothed. And the tooth next to these on each side is equally long but more slender, tapering, and very sharp-pointed. And the flies which I have bred from these cabbage larvæ are so very like those of the radish, as to excite doubts of their being really distinct from that species, merely having the three stripes on the fore body more distinct and of a black, rather than a brown colour. E. Sanders reports that one of the Albany gardeners had saved his plants from the general ruin of the preceding year, by sifting powdered tobacco upon them, so much only as to lay a fine slight dust on the leaves, and repeating this application whenever the dust was scattered off by a high wind or rain. And he is confident the fly will not alight to deposit its eggs upon plants which are thus dusted. If this is an effectual remedy, it will no doubt be equally effectual against other flies of this genus.

Young Centipedes, or Thousand-legged worms as they are commonly called, also attack the roots of the cabbage, and indeed, those also of most other garden vegetables. These creatures are so very small and lurk in such obscure situations during the day-time, that they are scarcely noticed, and no one is aware of the countless multitude of them that are scattered everywhere through the garden. As they are frequently seen associated with the wood lice or "sow-bugs," and have similar soft bodies and numerous short thread-like legs, they are currently supposed by the few persons who have formed any definite opinions respecting them, to be analogous to their larger comrades in their habits, and to subsist like them upon dead and decaying vegetable matter. But I find them clustering together and feeding upon living healthy vegetation of every kind that is soft and succulent in its texture, and that is lying upon or slightly under the ground where it is accessible to them. Being so extremely numerous, so decidedly injurious, and so wholly overlooked hitherto, the leading facts in relation to their appearance and habits, require even in this brief general account to be somewhat particularly stated, for correct public information.

Early in the day, when the earth is still damp from the night dews, if engaged in sowing seeds, uprooting small weeds, or any other garden work which causes us to closely inspect the surface of the ground, we shall frequently see a small brown worm, analogous in its appearance to the following cut (fig. 9), but only a quarter or a half inch long, slender and snake-like, flattened upon its back and with a row of thread-like legs, appearing like a fringe along each side of its body the whole length. It crawls slowly about, here and there, with many short turns, frequently turning its body almost together. If you inclose it in a dry box or vial, you will find it dead an hour afterwards. But put it in a vial of damp earth or wet moss, and it will live there for months, unless you allow it to get dry. You thus learn that it delights in a damp, humid atmosphere, whilst a dry situation is fatal to it. It therefore comes abroad only in the night time, wandering about over the moist surface of the earth, in search of the choicest food it can discover, whilst the hours of darkness remain. But as the morning advances, the sun is drying the top of the ground, and it can no longer continue there. It accordingly travels about till it comes to some crack in the ground, or some crevice under a stone or a piece of board, where the sun's drying rays do not penetrate, and where the earth will continue moist during the heat of day. Into that crevice it enters and there remains, until the dews of night are again falling, enabling it to leave its retreat. Thus on raising up a chip or a piece of board that happens to be lying on the ground in the garden, you will be astonished to behold the number of these worms that are frequently gathered there, so crowded together in one spot, in some instances, as to wholly cover and hide the surface under them.

On inspecting these creatures when thus brought to our view, we shall notice they are all sizes from a tenth to a half inch in length, the smaller ones being white

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and the larger ones brown. And they are seen to be of two very different forms. The major part of them are flattened or depressed upon the back. These all pertain to one species and are the young of the Flat-backed Centipedes, *Polydesmus complanatus*, one of the varieties of which has been described as a distinct species by Mr. Newman, under the name *Polydesmus Canadensis*, or the Canada Centipede. The others which are met with, associated with it, are long and slender, and perfectly cylindrical in their form. They are the young of different species of the Round Centipedes, which form the genus named *Fulus*. Although these Centipedes are classed as insects pertaining to the Wingless Order, *Aptera*, they differ remarkably from other insects in that they undergo no metamorphosis. The young worm which hatches from the egg, more resembles the larva than a perfect insect, but it never acquires wings nor passes out of this worm form into one that is different and more perfect.

From what has been above related of their habits, it will readily be perceived that when one of these Centipedes crawls into a crevice by the side of a root, and finds the white tender skin of the root presenting to it an abundant supply of food, it has no occasion to leave the spot, and will therefore remain there, night and day, until the store is exhausted. And others discovering the supply will join in company with it, until the situation becomes occupied with as many of these worms as can crowd themselves into it. Thus a large spot in the skin of the root is excoriated by them. The cabbage being so tender and succulent is particularly inviting to them. And I think that the disease called anbury or club root, is caused by the wounds on the root made by these insects. The large leaves of the cabbage keep the ground around the root constantly shaded and moist, rendering the situation peculiarly attractive to the Centipedes. Many of the stalks become inclined, by the action of the winds upon their leaves, and hereby a crevice is opened on one side of the root, into which these insects enter and there abide, feeding upon and crowding the exposed surface—keeping up a constant irritation of the part, causing a profuse flow of the sap to it, whereby in the more extreme cases it grows into the knobby canker-like excrescence termed the anbury. I am quite confident this is the manner in which this singular and fatal disease is produced.

These Centipedes can be caught quite easily by setting traps for them. Pieces of old boards and large chips placed here and there in the garden, will nightly gather a number of these insects under them. And they are readily killed by cutting them asunder with a pocket-knife. But decidedly the best mode of accomplishing the destruction of hosts of these and other noxious insects, is to confine in the garden, under a small coop, a hen with a brood of young chickens. The chickens will be abroad in pursuit of their morning meal, when the centipedes are everywhere crawling over the damp surface of the ground, and few of them will escape being picked up and devoured by these alert little foragers.

One of the saddest and most vexing casualties that is liable to befall the cabbage, is the severing of its stalk by the

## CUT-WORM.

These Cut-worms are the larvæ of a dark-coloured miller or moth. The particular species which is the parent of the Cut-worms in our gardens here in Eastern New York, and probably over the country generally, I have recently ascertained to be the *Agrotis nigricanus*, which in England is known by the common name of the Garden Dart-moth—the name “Dart-moth” being given to the species of *Agrotis*, from a peculiar mark which many of them have upon their forewings, having some resemblance to a dart or short spear. Everyone will be interested in knowing the exact appearance of this moth, that every few years occasions such serious losses in our corn fields as well as our gardens. We, therefore, present figures of it, its natural size, as it appears when at rest with its wings closed together (fig. 9), and its wings spread as in the act of flying (fig. 10). It is of a dark ash-gray colour and is recognized by four peculiar spots on its upper wings, two very pale ones and two coal-black ones; their exact shape and position being very



Fig. 9.—Cut-worm Moth, at rest.

accurately shown in fig. 10. These moths appear for about a fortnight, early in July, flying about by night and entering the open windows of dwellings; being attracted and bewildered by the bright light of a lamp, in the same manner that a horse is crazed to rush into the flames of a burning building. The moths drop their eggs around the roots of grass, and the small worms that come from them feed underground on the tender roots of the grass and other plants, during the autumn and spring, till they become two-thirds grown about the 20th of May, when they come to require stronger and more nutritious food to finish their growth. They then venture out of the



Fig. 10.—Cut-worm Moth, Flying.

ground by night to feed on the green vegetation above ground, and as daylight approaches they select some tender succulent plant, and cut it off half an inch above the surface of the ground and pull it aside, where they sink themselves slightly under the surface, and drawing the severed plant gradually in to them they feed upon and consume it during the daytime. It is this curious habit of severing cabbages, beans, cucumbers, and other tender young plants, to feed upon them during the long hours of daylight, that renders these cut-worms so pernicious. They cease their depredations soon after the middle of June, and crawl two or three inches deep in the ground to repose a fortnight in their pupa state. Cabbages can be effectually protected against them by rolling a walnut leaf, or even a piece of paper, around the stem when setting out the plants. But except in the case of cauliflowers or other very choice plants, this operation occupies more time than is repaid by the benefits resulting from it, since it is only at intervals of some years that these worms are a pest to us. The best course is to glance over the garden plants every morning, the last of May, and whenever a plant is found cut off, search around for the roughened spot in the ground where the worm is secreted, and disinter and kill it, that it may not destroy other plants the following nights.

The cabbage is greatly injured; especially when the plants are young, by

#### FLEA-BEETLES,

which perforate small holes in the leaves. Three or four species of these insects occurred in our gardens, but much the most common and destructive one is the Striped Flea-beetle, *Haltica tsriolata*, which is represented magnified in fig. 8, the short line on the right side being its natural length. As soon as the seeds of the cabbage sprout from the ground, these beetles begin to gather upon them, and ere you are aware of their presence, it may be that your whole bed of young plants is destroyed. And they continue through the season, though after the third or fourth leaf the cabbage has put out, the plant has acquired such strength as to withstand their attack. Dusting the plant with ashes, plaster, lime, snuff, soot, sulphur, or a mixture of two or more of these, every second or third day while they are young and small, should never be omitted. This repels the insects from the plants pretty effectually, but does not lessen their number in the garden. To destroy them the brood of young chickens already spoken of, is invaluable, and it should be the established custom to rear one or more of these broods in every garden each year—removing them when they are grown so large and their supply of insects diminished that they begin to pick the cabbage leaves or other vegetation. Equally important is it to place in the garden every toad that can be found. We can well tolerate these ill-looking creatures in view of the great number of onion-flies, cabbage and radish-flies, flea-beetles and other injurious insects they will destroy for us.

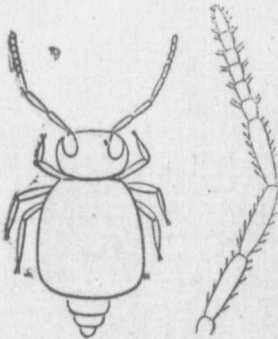


Fig. 11.—The Garden-flea.

#### THE GARDEN-FLEA,

*Smyntaurus hortensis*, another leaping insect, represented in outline greatly magnified (fig. 11), with one of its horns still more magni-

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Fig. 13.—Pupa of Cabbage Moth.

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fied to show its several joints, is an exceedingly minute insect, smaller than the grains of common gun-powder, which is present in myriads in the garden the fore part of the season. It is soft, black, and destitute of any glossiness. Where a wound is made in a leaf by a flea-beetle or other insect, these minute fleas become gathered along its edges, where they appear to feed upon the soft pulpy matter of the leaf, which is thus exposed to them, whereby the wound is made larger and is prevented from healing. The remedies for these insects are the same as for the preceding species.

## CABBAGE-MOTH.

The leaves of the cabbage are frequently seen having much larger holes gnawed in them than those which are made by the Flea-beetles. These larger holes are made by worms of several different kinds. One of the most important of these cabbage leaf-eating worms which we have in our country, is a species which occasionally appears in a particular neighbourhood in such excessive abundance as to completely riddle the leaves with irregular holes of all sizes, as represented in the accompanying fig. 12. It is a small cylindrical pale green worm, growing to somewhat exceeding a quarter of an inch in length, when disturbed wriggling briskly backwards and dropping itself down from the leaf by a thread. When it has completed its growth it encloses itself in a very pretty white gauze-like cocoon, with regular meshes like network, which is slightly tied to the leaf, its texture so thin that the pupa (fig. 13, the line on its upper side showing its natural length) is distinctly visible inside, of a white colour. It produces

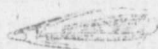


Fig. 13.—Pupa of the Cabbage Moth.

a small, delicate moth, which breaks through and crowds itself out from one end of the cocoon hereby making an open ragged orifice. This moth (fig. 14) measures nearly six-tenths of an inch across its wings when extended, and is of an ash-grey colour, its fore wings freckled with black dots and having a broad wavy white stripe on their inner margin. I have named this the cabbage moth (*Cerostoma Brassicella*).

## OUR COMMON WHITE BUTTERFLY

(*Pieris oleracea*), measuring nearly two inches across its wings, and which appears in May and June, and again in August, and may be seen hovering slowly over the water radish (*Barbarea vulgaris*) and placing one, two, or three eggs on the underside of each leaf, near the edge; if it fails to find a supply of these wild plants in the fields and meadows, will sometimes resort to the cabbages and turnips in our gardens. Its eggs in ten days hatch a small glossy white worm, which, as it grows, changes to a pale green colour. It remains on the underside of the leaf, eating large round and irregular holes through it. But it is never so numerous in our gardens as to be required to be searched out and killed.

The turnip is so closely related to the cabbage, that most of the insects which depredate upon one of these vegetables attack the other also. Thus the leaves of the turnip and ruta бага are liable to have large irregular holes eaten in them by the same pale green worms, the larvæ of the white butterfly, which we have already noticed as occurring upon the leaves of the cabbage. The

## STRIPED FLEA-BEETLE

frequently riddles the leaves of the turnips with small holes, and may always be met with upon these leaves in much the same numbers that occur upon the cab-



Fig. 12.—Cabbage leaf, as eaten with holes by the Cabbage Moth.



Fig. 14.—Cabbage Moth Magnified.



bage. It is of a sparkling black colour with two broad wavy pale yellowish stripes, as shown in the accompanying cut, the short line on the right being its natural length. Upon cutting into the root of the turnip, its interior is frequently found to be traversed by one or more worm tracks of a dirty brown or yellowish brown colour. These tracks are bored by a smooth cylindrical white maggot which appears to be identical in every particular with that of the cabbage-fly, *Anthomyia Brassicæ*. If any bristly maggot, like that of the turnip fly, *Anthomyia canicularis*, also occurs in the worm-eaten turnip of this country, I have never been able to meet with it.

When the old roots of the turnip and ruta bage are set out for growing seed therefrom, we may frequently see some of their flower and fruit stalks covered over and crowded through their whole length with mealy plant-lice, which in some instances extend out upon the slender stems of the pods and sometimes are so numerous as to cover the pod, also—these insects thus, to the utmost of their power, exhausting the plant of those juices which should go to swell and perfect the seeds.

#### THE CABBAGE APHIS,

*Aphis Brassicæ*, is an insect which is much more frequently to be met with than any other upon the cabbage and the ruta bage. Early in June, when the cabbage plants are but three or four inches high, these lice begin to make their appearance upon them. And ere long they become so numerous that they may usually be found upon some of the leaves of almost every plant, at all times from July until the close of the season—either wandering about solitary or stationary, and crowded together in clusters, wholly covering portions of the surface of many of the leaves. And frequently a spot will be observed upon a leaf, where a mealy powder and numerous white cast-off skins, and often a few plump and swollen pale brown bodies of individuals, which have been killed by internal parasites, show that a flock of these plant-lice have recently been located there, which has been totally destroyed by lady-bugs, and other enemies of these insects. It is upon the upper surface of the inner leaves, and upon the under surface of the outer leaves, that these stationary clusters of lice are located. Those which are in the former situation, are much the most pernicious, for by sucking the juices from and weakening this part, they cause the plant to head tardily and imperfectly, and if the lice continue numerous for some time upon these upper leaves, they become so exhausted that no head is formed by the plant. And in some instances the cabbage ground is invaded by such a host of these vermin, and they thrive so well and multiply so excessively, as to kill the plants outright. The clusters of these lice are almost wholly composed of wingless females and their young. One



Fig. 15.—Wingless Female of the Cabbage Aphis.

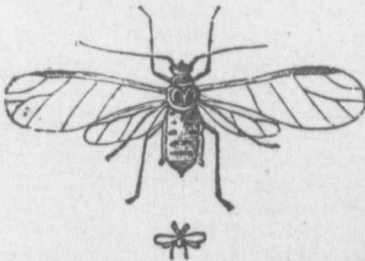


Fig. 16.—Winged Female of the Cabbage Aphis.

of these females is represented in the cut (fig. 15), greatly magnified. They are the largest individuals in the cluster and are of a pea-green colour, smoothly coated over with a whitish mealy powder. The young or larvæ, are similar to the mature insects in every respect, except that they are smaller in size. The small newly-born larvæ, however, are destitute of the mealy coating, and are more narrow and cylindrical in their form than the larger ones. Standing here and there in the cluster may be seen an individual having wings. In the annexed cut (fig. 16), is a greatly magnified view of one of these winged females, its natural size being shown in the small figure underneath. They are destitute of the mealy coating of the wingless lice, and are black and shining, with the hind body pale-green, with dark green or black bands, which are often narrowed or broken asunder in the middle. The natural enemies and destroyers of these insects—the lady-bug, the larvæ of the *Syrphus* flies, little blind maggots of a bright yellow colour, one or

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more of which will be seen in almost every group of plant-lice—are so numerous, and so alert and efficient in doing the work for which they were created, that we are usually safe in leaving the destruction of these vermin to them. But when clusters of these lice are discovered to be common upon the upper and inner leaves of the cabbage, I am confident it will be a great benefit to the plants to syringe these infested leaves with a strong solution of soap, as this will kill all the young and more tender lice, and will so invigorate the weakened leaves as to cause some of the plants to head, which will fail of doing so if left uncared for. If my cabbages should at any time become so thronged and overrun with these vermin, rather than suffer them to be totally ruined, I would set short stakes among them, and spread a carpet or a large piece of canvass over as many of the plants as the size of the cloth would cover, and would burn tobacco here and there in cups underneath, till I was certain the smoke had filled the whole of the enclosed space. Hereby every aphid would instantly be smothered. I should then remove the cloth, and wash the plants thoroughly, by sprinkling them with clean water from a watering-pot. I should then enclose and treat another portion of the plants in the same way, till I had gone over the whole. Tobacco smoke will cleanse any plant from lice, where it is so applied as to penetrate between the leaves sufficiently to reach every insect upon them. And this is the only certain remedy which is known. Strong soapsuds, so often recommended by writers, will kill all the young tender lice, but will leave most of the mature and old ones alive to found new colonies of these pests.

The Cucumber, the Squash and the Melon Vines are so closely alike in their natural characters, that the same insects which deplete upon one of these plants, prey also upon the others, manifesting little if any preference for either one of them over the others. They are attacked by a number of different insects, from some of which they frequently receive great and sometimes fatal injuries. The worst enemy of these vines is the striped yellow Cucumber Beetle, or

“CUCUMBER-BUG,”

As it is commonly but less correctly termed—scientifically named the *Galleruca Americana* by Gmelin, and afterwards *G. vittata* by Fabricius. This beetle, in its larva state is a worm living in the roots, and in its perfect state it gnaws the tender stalks of the young vines, frequently destroying the plants in one or the other of these ways. Early in the season, upon our first planting of cucumbers, melons and squashes, it frequently happens that the seeds do not sprout so as to make their appearance above the ground, these cucumber-beetles lurking in cracks under the surface and nipping the young shoots as they protrude from the seeds, thus totally destroying them. And in other instances, when the seeds have sprouted nicely, we are sometimes surprised to find, a few days afterwards, that every plant in some, if not all, of the hills has disappeared—these beetles having discovered and destroyed them, secreting themselves in the crevices of the ground around them. Finally, when our vines have escaped these calamities to which they are liable in their infancy, and are growing thriftily and maturing their fruit, a particular plant is sometimes discovered to have its leaves drooping and wilted through the whole length of the vine and its branches, and, in a day or two after, it is found to be faded, dry and dead. Ere long, another vine in the same hill follows it, and then perhaps others, till in some instances all the cucumber and melon vines in the garden are perished. No wound or other injury is visible upon the stalks or leaves of the drooping plant, and we thus are led to suspect the malady is seated in the root; and, on coming to inspect this part, we immediately discover the cause of the disaster. The root is found to be irregularly eaten in spots and pierced with small holes, and its central pith more or less consumed and spongy, with one or more worms, the authors of

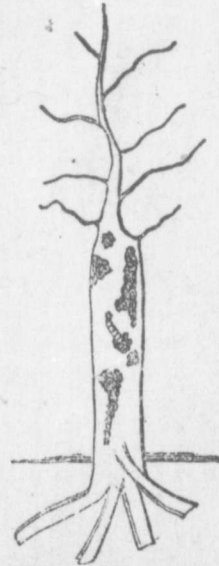


Fig. 17.—Cucumber root as bored by larvæ of the Cucumber-beetle.

the mischief lurking within it. The accompanying fig. 17 represents a root of the cucumber or melon of the natural size and form, with its bark eroded in irregular spots by these worms. It is a soft, slender, cylindrical worm, of a dull white colour, with the head and the last joint of its body black. It has three pairs of short, robust legs, placed anteriorly upon the breast, and a short, thick proleg at the tip of the body.



Fig. 18.—Pupa of the Cucumber-beetle.

When crawling, it moves curiously, the fore part of its body advancing slowly but continuously, whilst the hind part alternately halts and hitches forward suddenly, step by step. In other words, the six legs upon the breast are constantly in motion, carrying the anterior end of the body along without any pause, whilst the hind end is held by the single proleg, and only advances when the body becomes stretched, when it makes a long stride forward and again halts. The worm, when it is done feeding, forsakes the root and forms a little cavity in the ground, by turning itself around and around in the same place, and crowding the dirt outward until it becomes compacted upon every side of it, forming a little lump of such firmness that it will not crumble or break asunder from any motion given to the earth around it by the hoe or the plough. Inside of the cell which it thus forms, the worm throws off the larva skin and becomes a pupa, appearing as represented in fig. 18, the small figure on the left showing its natural size. It remains in this form about two weeks, lying doubled together in its cell, without moving, and as though it were asleep. It then casts off its skin again, and thereupon acquires its perfect form, but it is at first very soft and flaccid, and of a white colour. To enable the superabundant fluids of its body to evaporate, and its several parts to acquire suitable solidity and strength, it remains in its cell without any motion or symptoms of life for some days, when suddenly, as if touched with a shock of electricity, it awakes into full life and vigour, and with its feet and jaws briskly attacks the walls of its prison, breaking an opening through them, and scrambles upward out of the earth and runs fleetly away, joyously exulting in its new acquired life and liberty. It now has the form and parts shown in the accompanying fig. 19. It is glossy and shining, of a bright pale lemon-yellow colour, with the head and three stripes on the wing-covers black. These



Fig. 19.—Cucumber beetle.

beetles come forth from their winter retreats and begin to appear abroad as early as the commencement of May. They continue through the whole season, and are among the last insects which withdraw in the autumn, some of them remaining into the month of October. They manifestly prefer those plants which are most young, tender and succulent. After the stalks are so grown that they begin to shoot out into running vines, they are so robust and vigorous that they withstand the wounds which they continue to receive from these insects. Hence it is only when the plants are young and small that they require to be protected. The beetles are so shy and timorous that any new and unusual appearance about the cucumber hills may cause them to forsake them in some instances, when at other times they will have no effect. Hence, many of the remedies which have been proposed are of but slight efficacy and quite unreliable. Inclosing the hills in boxes, open at the bottom and top, ample experience has shown to be one of the securest protections of the many which have been proposed.

Next to the Cucumber-beetle, our worst enemy, particularly to the squash and pumpkin vines, is the

#### SQUASH BUG,

*Gonocerus tristis*, which is represented in the annexed cut, fig. 20. This is a true "bug"—it being of a soft leathery texture, dull in its colours, slow in its motions, fetid in its smell, flattened in its form, and it is greatly to be regretted that in this country we are so much accustomed to give this same name to insects so very different from this as are the hard-shelled, shining and brisk-motined "beetles." This squash-bug is of an obscure, dark brown or blackish colour, and on its under side

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Fig. 20.—Squash Bug.

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dull yellowish, varied with black points and freckles. It begins to find and attack the plants when they are first sprouting from the ground, puncturing them with its sharp, needle-like beak, and sucking their juices, thus causing them to wilt down and die—hiding itself under the loose surface-dirt or in the cracks of the surface immediately around the plants.



Fig. 20.—Squash Bug.

About the middle of June it commences depositing its eggs, gluing them to the under side of the leaves in clusters of ten, twenty or more. They are white, changing to a yellowish-brown, and hatch in about a fortnight, producing small wingless bugs of an ash-gray colour, which remain together in a flock upon the under surface of the leaf, casting their skins as they increase in size. This is the larva state of these insects; and when they are grown to half an inch in length they acquire two small oval scales, which are placed one upon each side of the fore part of the back, the bug being then in its pupa stage, and with the next change of its skin it obtains its perfect form and its full size. So common are these Squash-bugs in every garden in our country that they are well

known to every reader of these pages, and he is sufficiently aware of their pernicious character, and that if they are not combatted and checked in their career some of the vines will frequently be destroyed by them. From the time the seeds begin to sprout until midsummer the plants should be examined and freed from this enemy, more or less frequently, as it is found to be more or less common in particular years. The bugs are so large and so dark coloured that the eye readily perceives them, and they are so stolid and so sluggish in their motions that they are easily picked from the leaves, dropped to the ground and crushed beneath the sole of the boot. And during the latter half of June the eggs should also be destroyed by pressing and cracking them between the thumb nails, or those clusters which are near the margin of the leaf may be torn out and effectually trampled upon or taken to the house and thrown into the fire. The Squash Coccinella, or

#### SPOTTED SQUASH BUG,

As it has been called (*Coccinella borealis*), feeds upon the leaves of the squash, eating

in them large circular holes. We are so accustomed to regard the Cochinellas, or lady-bugs as insects of the highest utility, feeding as they do upon the plant-lice and everywhere freeing our vegetation from these vermin, that we view it as a singular anomaly that a member of this group should sustain itself upon vegetation. The larva is armed with branching thorn-like spines, symmetrically placed in rows. A magnified representation of its appearance when seen in front, and showing the formidable spines with which it is protected, is presented in fig. 21. It eats voraciously and grows rapidly. Both the larva and the perfect insect have the curious habit of first nibbling a curved



Fig. 21.—Front view of the larva of Squash-Coccinella magnified.

line upon the surface of the leaf marking out a circle or semi-circle, sometimes of great regularity, inclosing the portion of the leaf on which it is about to feed. The larva, after attaining its growth, crawls to some sheltered place upon the under side of the leaf or upon the stem, where it securely fastens itself, and changes to a pupa inclosed in the dried and thorny skin of the larva. It remains dormant in its pupa state somewhat over a week, when the beetle in its perfect state crawls out from the thorny case. It is now of a hemispherical form, as shown in the cut and of a dull yellow colour, with five black spots in a transverse row on the fore part of its closed wing-covers, five more spots in a transverse row across the middle, and two larger spots back of these near the tip. The only efficacious remedy yet found for these insects is hand-picking, or brushing them from the leaves into a cup partly filled with strong brine, which should be done when they first appear in June, before they commence laying their eggs.

The little black flea-beetles which infest the cucumber and melon leaves, perforating them with numerous small holes, are mostly the

## PUNCTULATED FLEA-BEETLE,

*Psylliodes punctulata*. They are closely like the kind which occurs upon potato leaves hereafter to be noticed, but when carefully examined with a magnifying glass their differences are sufficiently evident. Those which occur upon the cucumber leaves are brassy-black, with the surface of their bodies finely punctured, and their shanks, feet, and the first joints of the antennæ pale, obscure yellowish. The remedies already mentioned for the Striped Flea-beetle are equally efficacious for this and the several other species of flea-beetles.

## THE ASPARAGUS BEETLE.

*Crioceris Asparagi*, long noted in Europe as being most pernicious to this plant, in 1862 had become so exceedingly multiplied and was overrunning the asparagus in such countless millions as to threaten to kill the plants and put an end to their cultivation in the market gardens in the neighbourhood of New York, where this was a crop of such very great value. These beetles and their larvæ feed upon the asparagus through the whole summer season. The accompanying cut gives a view of this insect in its different stages. The beetle is seen in its natural size and shape at *a*. It is of deep-blue colour, very bright and shining and prettily ornamented with yellow-spots. It places its eggs on the leaves of the plant, as seen represented at *b*, the magnified eggs being seen at *c*. From these hatch larva of a dull olive or ash-gray colour, which is represented at *d*, full grown at *e*, and magnified at *f*.

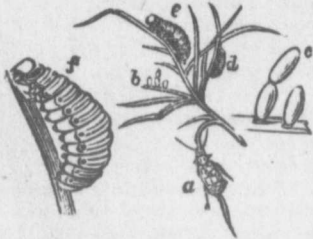


Fig. 22.—Asparagus Beetle, its eggs and larvæ.

Its pupa state is passed under the ground.

## THE TOMATO WORM.

The tomato in all our gardens is infested with a very thick bodied green worm, with oblique white streaks along its sides, and a curved thorn like horn at the end of its back, as represented in the accompanying cut, fig. 23, which shows the appearance of this worm when it is grown to about half full size. Between thirty and forty years ago, when the tomato was first beginning to be extensively cultivated in our country, this worm appearing upon it was an object of much terror, it being currently regarded as poisonous and imparting a poisonous quality to the fruit if it should chance to crawl upon it. Now that we have become familiarized with it these fears have all vanished, and we have become quietly indifferent towards this creature, knowing it to be merely an ugly-looking worm which eats some of the leaves of the tomato, and which is chiefly interesting to us in consequence of its being about the only insect enemy belonging to the plant. As the worm, however, is so common and well known, every one feels curious to know also its history and the insect which produces it. We therefore here present a short account of it, with figures illustrating its appearance in the different stages of its growth.



Fig. 23.—Tomato-worm.

It is currently supposed that these worms belong exclusively to the tomato. They, however, occur on the vines of the potato also. And in those neighbourhoods where the tobacco is cultivated, they invade that plant likewise, causing much injury by the holes they eat in the leaves, whence they are the worst enemy with which the tobacco grower has to contend. Thus it is one and the same insect which is popularly named the Tomato-worm, the Potato-worm, and the Tobacco-worm, as it occurs upon one or the other of these plants. The annexed cut, fig. 24, represents the moth or miller which is the parent of these worms, diminished to half its natural size. It is of a gray colour, with numerous irregular and obscure black lines upon its wings, and a row of five round ochre-yellow spots along each side of its hind body, from which it has received its scientific name, *Sphinx quinque-maculata*, or the Five-spotted Hawk-moth, as it is termed in books. These moths come

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abroad one after another through the whole summer and autumn, but are most numerous in July. During the day time they remain at rest, hid from view, and come out in the evenings to feed and lay their eggs. Their whole food is the honey of flowers, for obtaining which they are furnished with a remarkably long slender tongue, which, when not in use, is coiled up like a watch spring and concealed between the palpi or feelers at its base. When hovering round flowers and extracting the honey from them the moth resembles a humming-bird in its motions and also in the sound made by its wings. The tongue is fully extended at such times, and being five or six inches in length, the moth is poised on its wings at a distance of some inches from the flower from which it is sucking the honey. The eggs are probably placed on the under side of the leaves of the plants on which the worms occur. The worms are voracious feeders, consuming a large quantity of foliage and growing rapidly. When they have attained their full size they leave the plants on which they have fed and root downwards into the ground to the depth of some inches, and there become quiescent, and casting off the larva skin, they appear in their pupa form, represented in fig. 25, diminished one-half in size. The pupa is covered with a hard crustaceous shell of a glossy bright chestnut colour, and is particularly curious from having its forward end prolonged on one side into a long, slender, limb, which is bent backwards, reaching to the middle of the body, where its end touches, and is firmly soldered to the surface, thus forming a kind of loop, resembling the handle of a pitcher—this being the sheath in which the tongue is enclosed, which becomes developed to such a remarkable length in the perfect insect, as we have above observed. The insect remaining in this pupa form through the winter and spring, its internal parts growing and becoming developed until the shell at length cracks open and the moth withdraws itself from it, crowds upwards through the ground, and comes forth in its perfect form.

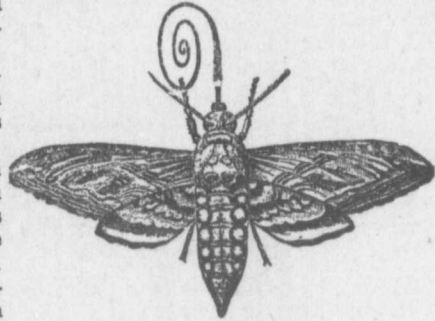


Fig. 24.—Tomato-worm Moth.

The potato usually is the least molested by insects of any important vegetable we cultivate. However, the Ten-lined Potato-beetle, *Doryphora 10-lineata*, a figure of which is presented in the accompanying cut, is sufficiently numerous and destructive to make up for this. This beetle is of a regular oval form, very convex above and flat beneath, of a hard crustaceous texture, smooth and shining, of a bright straw yellow colour, with ten black stripes upon the back of its closed wing-covers. It is upwards of forty years ago that this insect was first noticed, upon the upper Missouri and Arkansas Rivers, some hundreds of miles west of the Mississippi. It has no doubt always existed in that region, living upon some wild plant growing there, very probably the stramonium, and it was never known to attack the potato until the year 1861, when in different places in Kansas and Western Iowa, it suddenly fell upon this crop in such immense numbers as to literally cover the vines, eating from them every vestige of their leaves, and leaving the stalks perfectly bare. It also consumed the leaves of the tomato with equal avidity. The next year it re-appeared early in the season, soon after the potatoes were sprouted from the ground, and in a short time commenced scattering its eggs everywhere upon the leaves and stalks, the young filthy worms from which also fed upon the leaves in company with the parent beetles, keeping them so eaten down that no tubers, or at least none of sufficient size to be any value, were found to be upon the roots. And it has since continued to appear, multiplying and extending itself each year, advancing east-



Fig. 25.—Tomato-worm Pupa.

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Fig. 26.—Ten-lined Potato-beetle.

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ward at the rate of seventy or eighty miles annually. It has already crossed the continent and even the Atlantic Ocean.

THE THREE-LINED POTATO-BEETLE, *Crioceris trilineata*, is an insect related to the preceding, which has always been common upon the potato vines, feeding on the leaves both in its larva and its perfect state. The accompanying cut will give the reader a correct idea of its form and general appearance. It has a considerable resemblance to the yellow striped cucumber-beetle which we have already noticed, being of a bright lemon-colour with three black stripes upon its closed wing-covers, but it is larger than the cucumber-beetle, and easily distinguished from that insect by having a yellow instead of a black head. Probably not a year occurs that this Three-lined Potato-beetle is not to be found on the potato vines in every neighbourhood throughout our country; but it is much more abundant some years, and when unusually numerous, fears are frequently excited by it. It is also common upon the stramonium, which is probably the plant upon which this insect chiefly sustained itself before the potato began to be cultivated here. This latter now furnishes it such extensive feeding grounds that its numbers are no doubt much greater now than they could have been originally; and in the course of time it may become so increased as to be a serious evil.



Fig. 27.—Three-lined Potato-beetle.

These beetles pass the winter in any dry and sheltered situation which they find, under boards, masses of leaves, &c. They begin to be seen abroad the latter part of May. They are shy and timorous, taking wing as you come near them, and flying a few yards away. When annoyed or in distress, they make a creaking cry by rubbing the tip of the body up and down against the hind end of the wing-covers. When the potatoes are well up, they gather upon them, eating large irregular holes in the leaves, and ere long commence depositing their bright yellow eggs, gluing them to the leaves in clusters of from six to ten in number. They hatch in a fortnight, and the larvæ from them continue together in a flock upon the under sides of the leaves. They are wet, slimy, slug-like worms of a most filthy and disgusting appearance, coating themselves over with their excrements, probably to protect them from being devoured by birds. When they have attained their growth, they descend into the ground to pass their pupa state. Should these insects anywhere become so multiplied as to do any severe injury to the potato crop, the readiest mode to diminish their numbers, I think, will be to search out the little flock of the larvæ by passing along the rows of the potato vines, and break off the leaves on which they occur, dropping them upon the ground and trampling upon them.

THE STRIPED BLISTERING-FLY, already noticed as feeding on the leaves of the beet, at times appears in immense multitudes in one district of the country and another, eating the potato vines bare of their leaves. Other kinds of these blistering flies also feed upon the potato leaves, and are liable to be quite numerous at times. They are similar in size and form to the striped species, being cylindrical and about half an inch in length, but are readily distinguished by their colours. Much the most common kind here at the north is the Black Blistering-fly, *Cantharis Pennsylvanica*, which is of a deep black colour throughout, and without spots. We occasionally meet with the Ash-edged Blistering-fly, *Cantharis cinerea*, also, this being black like the preceding, but having its wing-covers edged with ash-gray from fine short hairs of this colour. Another species is the Ash Blistering-fly, *Cantharis Fabricii*, which is wholly coated over with short ash-gray hairs. Each of these insects becomes more common to the south of us, where still other kinds of these flies are associated with them, whereby the potato crop there suffers more frequently from them than it ever does with us. The large green Tomato-worm, *Sphinx quinque-maculata*, as already stated, is somewhat common upon the potato also, eating its leaves. The potato leaves are also much infested with little black flea-beetles, perforating them with small holes, frequently in such immense numbers that they cannot but be a detriment to the



Fig. 28.—Truncated Snapping-beetle.

crop. The *Haltica pu* ready spoil short whit the garden treats. It the most in ing thron be a serio in their g insects bef already me Among t

So called f hardness, t



Fig. 29.—Wire-caged fly.

they have t upward sev doing so, t spring mak hence come though the Elaters or quently nu roots of gr germinate. onions and lobelias, an tion of the where arou the slender and turn y badly injur the particul this countr, to the Euro larvæ, it ha be one of o *truncatus*. short and t its natural the wing-co and a side indicate to showing th no impress joint of its a somewhat towards the pores. As situations w manently ir

crop. The species which is most common upon this plant is the Hairy Flea-beetle, *Haltica pubescens*. This is slightly inferior in size to the Striped Flea-beetle already spoken of, and is not at all glossy. It is black and thinly coated with short whitish hairs, its antennæ and legs being dull yellow. It is abundant in the garden from early in May till the frosts in autumn drive it into its winter retreats. It attacks several plants in addition to the potato. To the petunia it is the most injurious of any insect in my experience, the young seedling plants becoming thronged and ruined by it unless they are closely watched. It is also apt to be a serious evil to the young tomato plants, which are weakened and retarded in their growth from the numerous wounds they sometimes receive from these insects before their presence is observed. The remedies for this are the same as already mentioned for the Striped Flea-beetle.

Among the worst pests to our garden crops, and to our field crops also, are the

## WIREWORMS,

So called from their having some similarity in their form, their smoothness, and hardness, to a piece of wire. They are remarkably long, slender, cylindrical worms,

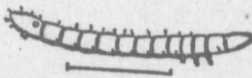


Fig. 29.—Wireworm of the Truncated Snapping Beetle.

of a whitish or tawny yellow colour, a very tough, smooth and glossy skin. They are the larvæ of the Elater group of beetles, which are known to every one from their curious manner of recovering their upright posture when they chance to fall upon their backs. Their legs being too short to enable them to turn over,

they have the faculty of giving them a sudden snap or spring, whereby they bound upward several inches, and in falling usually alight right side up, or if they fail of doing so, they repeat this spring again and again, until they succeed, with each spring making a loud click, similar in sound to the ticking of a clock. They have hence come to be designated in this country by the name of "Snapping-bugs," although they are beetles and not bugs in the correct sense of those terms. These Elaters or Snapping-beetles are an extensive group of insects, and there are consequently numerous kinds of wireworms. They live underground and feed on the roots of grass and other vegetation, and on planted seed which are beginning to germinate. They are known to attack potatoes, turnips, cabbages, beets, carrots, onions and lettuces in our gardens, and also strawberries, pinks, carnations, dahlias, lobelias, and numerous other flowers; but the greatest losses are from their destruction of the field crops, Indian corn, wheat, rye, barley, and oats. They bore everywhere around through the bulbous and other thick roots of some plants, and cut off the slender thread-like roots of others. And it is not till the plants begin to wither and turn yellow that their presence is suspected, when the plants are usually so badly injured as to be beyond recovery. It has not been known hitherto which were the particular species of Snapping-beetles which produced the wireworms which in this country injure our crops. As one of our species bears a very close resemblance to the European beetle which has been most noted for the destructiveness of its larvæ, it has been conjectured that the wireworm which this species produced would be one of our most injurious kinds. This is the Truncated Snapping-beetle, *Agrates truncatus*. Among the insects of this group this is a species which is remarkably short and thick, as represented in fig. 28, the smaller one on the right hand showing its natural dimensions. It is of a dark brown colour, with the wing-covers a shade paler than the fore part of the body; and a side view of the wireworm which my observations indicate to be the larva of this insect is given in fig. 29, showing the full length to which it grows. This worm has no impressed line along the middle of its back, and the last joint of its body is nearly twice as long as broad, ending in a somewhat acute angular point, and having on its upper side towards the base two conspicuous dots, resembling breathing pores. As this beetle and worm have occurred to me only in situations where the land is never ploughed, but remains permanently in grass, it is not probable that this is a species

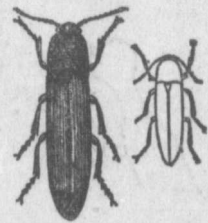


Fig. 30.—Common Snapping Beetle.

which attacks our cultivated crops. The Elater, which is most frequently found in our gardens, is the *Cratonychus communis*, or the common snapping-beetle, which is represented in fig. 30, the outline figure on the right being its natural size. It is of a dark chestnut colour, covered over with short, fine, prostrate ash-gray hairs, its wing-covers having rows of punctures resembling the stitches in a garment, and its forebody showing an impressed line in the middle. This species is well entitled to the name it has received, it occurs so plentifully in such a variety of situations. During the months of April, May, and June it is most abundant. Its numbers then diminish, and it nearly or quite disappears in August, but is again met with in September, and till the close of the season. A corner of my garden having been unoccupied a few years, became overgrown with quack grass, and in April a perfect swarm of these beetles were there gathered, basking in the warm sunshine, having hatched



Fig. 31.—Common Wireworm.

from wireworms, I suppose, which had fed upon the roots of this grass. They occur quite frequently also in strawberry beds, and similar places where the dense foliage furnished a hiding place for them. The wireworms which I meet with in the garden are nearly all of one particular kind, and I hence have little doubt they are the progeny of these beetles. A magnified view of the back of these wireworms is given in the cut, fig. 31, the straight line below showing the length to which they grow. This garden wireworm has a strongly impressed line along the middle of its back, and is particularly distinguished from other wireworms by having three obtuse teeth-like projections at the end of its body, the middle one being much larger and more conspicuous than the lateral ones. It is to be regretted that no certain and efficacious remedy for the wireworm has yet been discovered. Every worm of this kind which is turned up to view in cultivating the garden should be destroyed. The small young worms, less than a fourth of an inch in length, which occur the most common in autumn, it is especially important to kill. As the wireworms are particularly fond of the potato, it was long ago recommended to employ slices of this tuber as a trap with which to capture them. Several of the contributors to the *London Gardeners' Chronicle* concur in this as being the best mode of freeing the garden, at least, from these troublesome visitors. Mr. Adan says it is his practice to place near any infested plants half a potato, with the eyes cut out to prevent its growing, running a pointed stick through it and pegging it into the ground, covering it over with about an inch of loam, and in a day or two, he states, he has pulled out from fifteen to twenty wireworms, bored into one of these slices of potato. Turnip, carrot, beet, apple, etc., are reported to answer the purpose equally well as the potato. This remedy was proposed so long ago that I am surprised it has not come into more general use, if it is as successful as the accounts of it represent it to be. These worms are also reported to be so fond of rape-cake, that if this be applied to the ground as a manure they will forsake everything else to feed upon it. If this be the fact, this substance is worthy of more attention than it is receiving.

#### A HORSE CLEANER.



Wood Horse-cleaner.

In muddy weather the legs and bodies of horses frequently become covered and encrusted with the hardened mud, which, for the comfort of the animal as well as decent appearance, should be scraped off, and the hair brushed clean, dry and smooth. A cheap and simple scraper may be made either of wood or sheet iron. One end is rounded so as to be held comfortably in the hand, and the other sloped to an edge.

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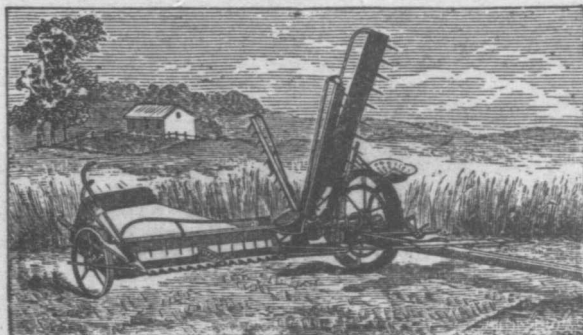
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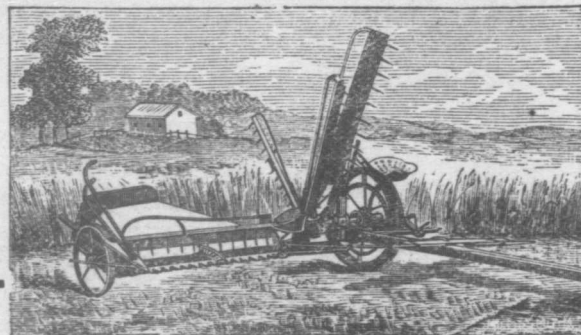
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# MOWING & REAPING MACHINES.



SHARP'S  
HORSE  
RAKES.



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THE MASSEY MANUFACTURING COMPANY,  
TORONTO, ONTARIO.

FIRST PRIZE SILVER MEDAL, AWARDED TO THE  
MASSEY HARVESTER,

AT THE GREAT INDUSTRIAL EXHIBITION, TORONTO, 1879.

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AT THE GREAT CENTENNIAL EXHIBITION, PHILADELPHIA, 1876.

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HIGH!

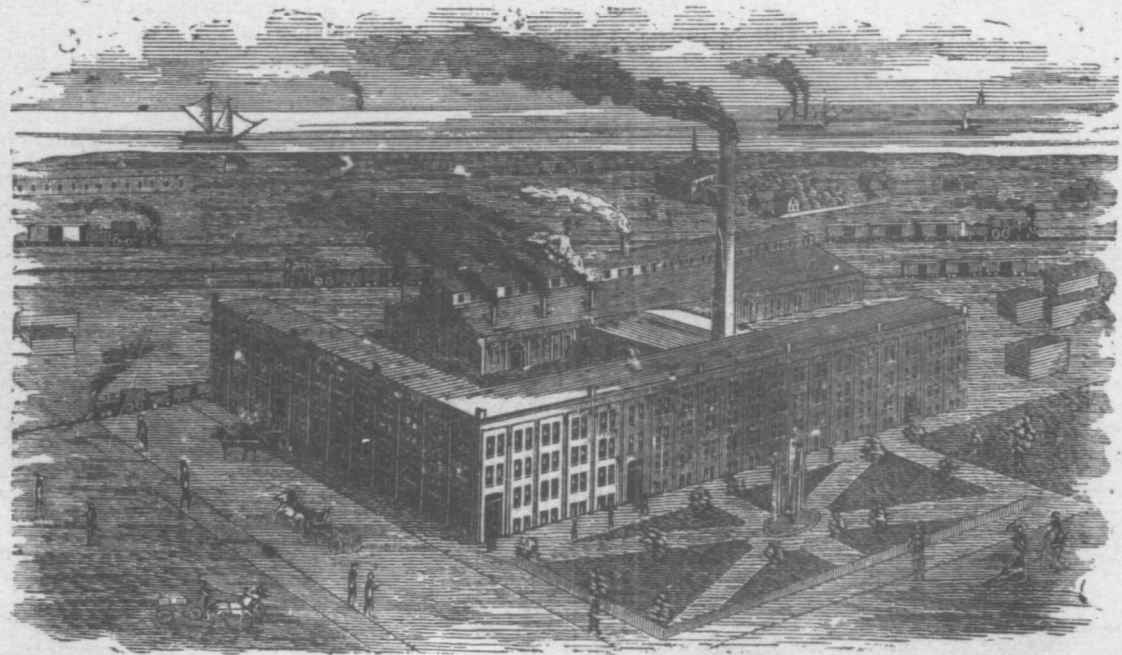
# First Prizes, Two Medals, Two Diplomas, Awarded to Sharp's Rake

AT THE GREAT CENTENNIAL EXHIBITION, PHILADELPHIA, 1876.

ALWAYS SUCCESSFUL!

IN THE

FIELD AND EVERYWHERE!



HIGHEST PREMIUMS!  
GREATEST DISTINCTION!

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WE HAVE NOW COMPLETED the entire Removal of our Business from Newcastle to Toronto, and are pleased to say that our present facilities are unsurpassed in Canada. For some years past our Newcastle establishment was unable to supply the demand for our goods. We first enlarged the premises, then ran the works day and night, and finally decided to build a complete New Factory on a larger scale, in a more central location, and possessing increased shipping facilities. Our New Factory, in which has been adopted all the modern improvements of the best American and Canadian shops, is located on six acres of the old Exhibition Grounds, alongside several of the leading Railways entering the city. No expense has been spared to make the buildings the largest and most complete in every particular, and in filling them with the Choicest and Most Approved Machinery—A 100-Horse-Power in height, including basement, manufactured in Fitchburg, Mass., driven by two 60-H. P. Boilers, furnishes the power. The main building, which is 350 ft. long by 50 ft. wide, and four stories in height, is heated throughout by steam. Three powerful steam elevators convey the various materials or finished Machinery from one flat to another. The Foundry and Blacksmith Shop is 200 ft. long by 60 ft. wide. Tracks leading from the several Railways are placed alongside the buildings for convenience in loading and unloading cars, thereby saving cartage. Our customers everywhere will appreciate our efforts, and hail with satisfaction the immense advantages to be gained by them in our enterprise. Orders for Mowers, Reapers and Rakes, for next season's requirements are already pouring in. All our Manufactures are fully warranted. Send for Descriptive Catalogue. Address,  
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## INSECTS THAT FREQUENT THE ORCHARD.

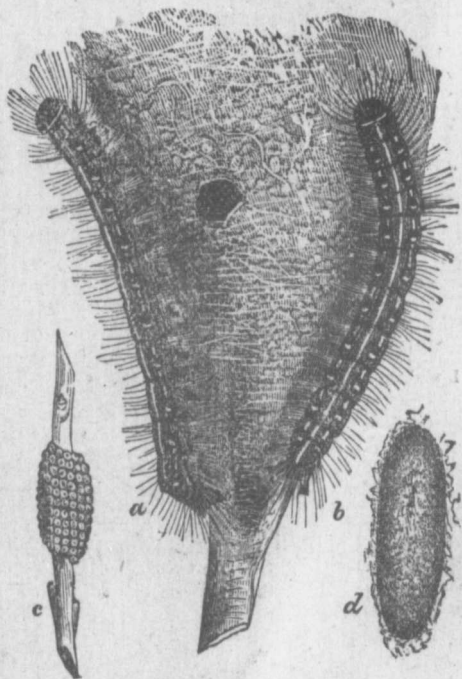
Shall we wage indiscriminate war against insects?

"The noxious insect that intrudes may die." This is the judgment of the poet Cowper, and it appears to be a reasonable one; but we must not suppose that every insect is noxious, nor must we regard every appearance of an insect as an intrusion. It is well for the fruit-grower and the horticulturist to acquire a knowledge of Entomology, that they may be able to destroy judiciously. An indiscriminate slaughter of insects is an offence against Nature, "who when she formed, designed them an abode."

## HOW TO DESTROY INSECTS.

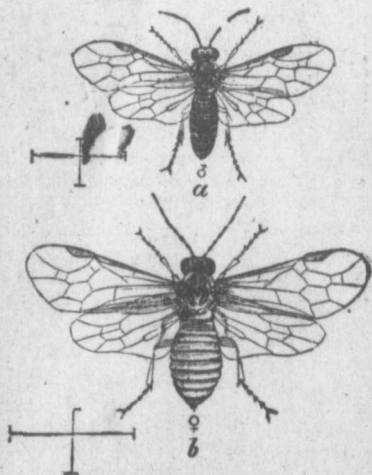
To destroy the troublesome tent caterpillar, the best plan is to look, in the winter, for the patches of eggs on the twigs of the apple-trees, and to remove them with the thumb-nail, and then cast them into the fire. The red-humped caterpillars of *Notodonta concianna* will be found in the early stages of their growth, lying closely packed, side by side, on a few of the leaves of the apple-tree. So will the striped caterpillars of *Pygæa ministra*. The leaves so occupied should be picked and trodden with their burdens under foot. A free use of hellebore dissolved in water, and applied by means of the water-can and rose, will free the berry bushes and canes from the larvæ of Saw-flies and Geometrina. The war against Aphides should commence as early in the year as possible; for it should be borne in mind that only every eighth or ninth generation of plant-lice indulges in connubiality. Winged males and females appear in the autumn (or early spring). All the succeeding broods consist of wingless females, to the eighth generation. Males then appear again, to reorganize Aphidean society for another succession of broods. A little cluster of plant-lice, overlooked, will increase and widen its operations, till at length a whole plant will suffer; whereas an early removal of it would have freed the plant for the whole season. The larger caterpillars should be carefully "hand-picked."

Under a combination of favourable circumstances, insect tribes will increase, in some



TENT CATERPILLAR

a, b, larvæ; c, cluster of eggs; d, cocoon.



IMPORTED CURRANT WORM.

a, male; b, female, the hair lines showing natural size.



IMPORTED CURRANT WORM.

Leaf showing eggs (1), and holes which the young worms make (2).



IMPORTED CURRANT WORM.

a, a, a, larvæ; b, a magnified joint of body showing black tubercles.



Purple Tiger Beetle (*Cicindela purpurea*).

animals, birds, and insects, is often followed by a dangerous increase of the plant consumers. The man who shoots the woodpeckers may look for an increase of destructive "bores"; and he who drives away the Tits may expect trouble from a variety of pests.

Among the predatory insects which may be ranked as the gardener's friends, distinguished places are held by the Ground Beetles (*Carabidæ*), and Tiger Beetles (*Cicindelidæ*); by the Ichneumons (*Ichneumonidæ*), and sand wasps (*Sphegidæ*), &c., which prey on larvæ; by the *Proctotrupidæ*, which destroy the eggs of insects; by the Hawk-flies

instances to an alarming extent, and then, after a time of ascendancy, dwindle away till they all but disappear. The introduction of a species from a distant place is usually followed by a rapid increase of that species. This probably is largely owing to the absence of the natural counter-checks to its kind.

The introduction of the English House-fly to New Zealand was followed by so startling an increase as to attract the notice of the Maories, who, in one of their songs, says—

"As the Pakeha fly has driven out the Maori fly,  
As the Pakeha grass has killed the Maori grass,  
As the Pakeha clover has slain the Maori fern,  
So will the Pakeha destroy the Maori."

In America we have had never-to-be forgotten instances of the rapid increase of imported insects, in the Hessian fly—supposed to have been brought over in straw, to Staten Island, by the troops under Sir W. Howe, and the potato beetle, for the migration of which, from the slopes of the Rocky Mountains, settlers unwittingly bridged the prairies.

The opening up of a country increases the numbers of many of the insect tribes; and so does a succession of fine seasons.

The insectivorous creatures should be protected.

The destruction of predatory tribes of ani-



Fiery Ground Beetle. (*Calosoma Calidum*.)



Musky Ground Beetle (*Harpalus Caliginosus*).



Hairy necked Tiger Beetle (*Cicindrela Hirticollis*).

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Spotted Larva bird (*Hip damia Ma lata*).

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## INSECTS THAT FREQUENT THE ORCHARD.

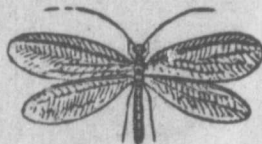
(*Syrphidae*), Lace-winged flies (*Hemerobiadae*), and Lady-birds (*Coccinelladae*), which prey on plant-lice.

### PHILAMPELUS ACHEMON

This creature, in the larva state, grows to be three or four inches long. It is remarkable for the swollen appearance of the fourth segment of its body, and for the power which it has of protruding and drawing in its head and first three segments. Caterpillars of like build are known in England by the name of *Elephant* and *Hog* caterpillars. The creature loses its horn in an early stage of its existence, but retains a raised spot where the horn fell away. Its natural food is the Virginia Creeper (*Ampelopsis quinquefolia*), but as its name implies, it loves the vine.



*Chrysopa*. Egg, Larva and Fly.



Lace-winged Fly.

A very beautiful and perfect specimen of the moth was taken two or three years ago, in a frame, at the foot of a large vine in the garden of Col. Hall, at East Farnham. Last season the caterpillars were rather numerous in this neighbourhood.



Spotted Lady-bird (*Hippodamia Maculata*).

### CHEROCAMPA PAMPINATRIX.

This species is closely allied to the preceding. I have taken the caterpillar in Brome feeding on the Creeper. In Ontario it does much mischief. In colour it is green and brown; and it has a row of orange spots on the back. Its fourth and fifth segments are much swollen, and its head is very small. It is one of the "Hog Caterpillars."



13-Spotted Lady-bird (*Hippodamia 13-punctata*).

### THE TOMATO WORM.

The larva of the Five Spotted Hawk Moth is one of those called Sphinx Caterpillars from the resemblance which they are supposed to bear to the Egyptian Sphinx. Under the name "Tomato Worm" it has been much vilified by newspaper correspondents. Beyond, however, feeding upon our tomatoes and other Solanaceous plants, it does us no hurt. It is green, and has transverse side-lines of a lighter shade. Its spiracles are conspicuous, and it has a horn of formidable appearance. It grows to be three inches or more in length. As is the case with most of the sphinxes, the position of the Tomato Worm is often betrayed by the accumulations of its peculiarly moulded excrement. When full-fed the creature descends in the earth, and there forms a cist in which to pass the pupa stage of its existence. The chrysalis has a remarkable proboscis-case resembling the handle of a pitcher. The moth is a very large grey moth, having five yellow spots along each side of the abdomen.

### THE SAGE WORM.

This insect attains its full growth in September. It is sepia coloured—slightly granulated like "Shagreen," and has a varnished appearance. Its anal horn is black and rather small. The first segments to a limit beyond the pro-legs are horn-coloured and semi-transparent, bearing two black, shield-shaped spots, the hinder of which is much larger than the former. The pro-legs are black. The creature has whitish transverse side-lines—the hindmost being broader than any of the others. The spiracles are black. The head has two longitudinal whitish lines.

### THE BLIND-EYED SMERINTHUS.

The *Excœcatus* caterpillar, which feeds on the apple tree, and sometimes damages young trees in the nursery, may be known by its granulated appearance and its triangular head. It is a light green, and has a stout horn. The moth is a beautiful object, and has rosy hind wings, ornamented with eye-like spots.

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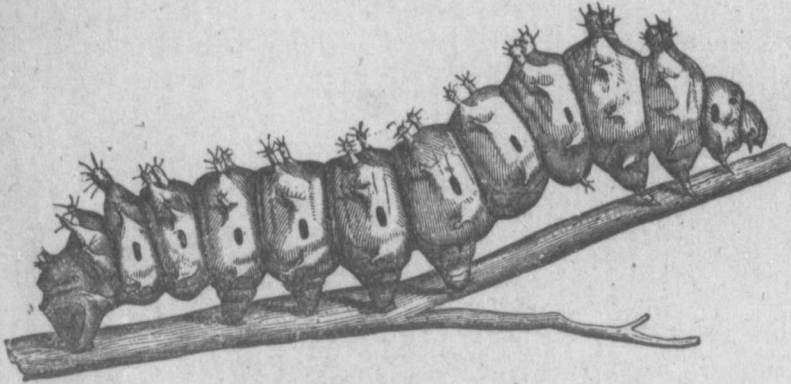
und Beetle  
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necked Tiger  
(*Cicindrella  
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## INSECTS THAT FREQUENT THE ORCHARD.

### ATTACUS CECROPIA.



THE CECROPIA CATERPILLAR.

The caterpillar of this magnificent insect is the largest of those that attack our apple-trees. It will thrive also on the plum and the cherry. It grows to be four inches in length, and as thick as a man's thumb. In colour, it is bright green, and it is ornamented with egg-shaped warts set with short, black spines, and variously coloured—coral-red, yellow and blue. It is a voracious feeder. A friend of mine observed the growth of three individuals of the species daily, till they reached their full size. They were feeding on an apple-tree outside his window; and, in the still summer evenings, the sound of their munching was plainly heard from his position twenty feet away. These insects afforded him opportunities for witnessing the progress of sloughing. After the head was freed, the skin was worked backward. First one segment of the body was expanded and contracted alternately, till quite free, then the next, and so on, till the change of dress was completed. The skin even of the small spines on the warts of the creature came away. The whole process occupied twenty minutes.

### WOOD CARRIER



Wood Carrier.

For conveying wood by hand from the wood-house to the fire. It obviates the necessity of piling the sticks on the arm, one by one, and then carrying them into the house, the wood being placed at once upon the frame where it is not lifted until the frame is filled. When wood has been dusted or covered with snow, it is easily knocked off by striking two sticks together before placing upon the frame. It is made in a manner quite similar to the common saw-buck, the sides not being quite so wide apart and longer above the round that holds them together. It consists of four strips of hard wood, one inch thick, four inches wide, and four feet long—crossed eighteen inches from the lower ends, nailed and clenched with wrought nails. An auger-hole, an inch and a fourth in diameter, is bored through at the crossings, and a round connecting-rod, fifteen inches long, inserted.

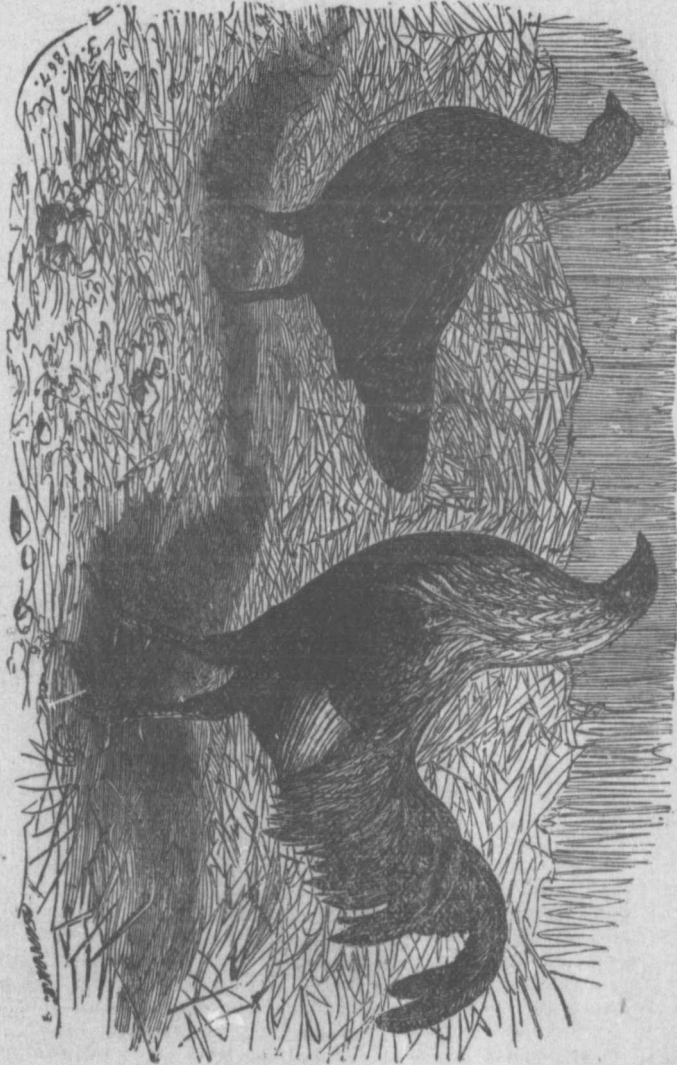
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GAME.

No variety of fowl has been so enthusiastically cultivated by amateurs as the Game, and in none perhaps is there so much room for legitimate difference of opinion. The varieties are legion, and to describe every one would be hopeless,



DUCK-WING GAME.

except in a work specially devoted to the purpose ; we shall therefore only give descriptions of the leading breeds.

“The Game cock, as the undisputed king of all poultry, requires more careful judging in regard to shape, than any other bird. The Brown-reds have long been most perfect in outline ; but the following description will apply to a perfect bird of any breed.

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"The beak should be strong, curved, long, and sharp; the comb single, small, and thin, low in front, erect, and evenly serrated; it is usually red. Head long and sharp, with the face and throat lean and thin. Ear-lobes small and red, never whitish. Neck long, strong, and well arched; the hackle short, hard, close, firm, and broad in the feather. Back short, and very hard both in flesh and feather; broad at shoulders, narrow at tail, and rounded at the sides. Breast broad and very hard, but not by any means too lean or too full—the last would be useless weight; a good hard breast is most essential, as it is the most vulnerable part of the bird. The rump should be narrow, neat, and short, the saddle feathers close, hard, and short. Wings very strong, and of a just medium length, well rounded in the body, and carried neither high nor low, but so as to protect the thighs. Very long-winged birds are usually too long in the body, and short-winged birds too broad in the stern. Tail neither long nor short, but medium length, and carried erect to show good spirit, but not 'squirrel-fashion' over the back; it should be well 'fanned,' or spreading, and the sickle feathers of a good round full curve, and standing clearly above the points of the quill tail-feathers. Very long-tailed birds are soft and long-bodied, and short-tailed birds are too short-winged, and often have broad rumps. Thighs short and very muscular, hard and firm; placed well wide apart, and well up to the shoulders, in order to give a fine fore-hand and make the bird stand firm on his legs; which latter should be sufficiently long, but not too much so, and placed wide apart as the thighs. Spurs low down, long, sharp, and rather thin; a little curved upwards, and not turning in too much. Feet flat, broad, spreading, and thin; the claws and nails straight, long, and strong; the back claw especially long and flat to the ground, to give a firm footing. The whole plumage should be very close, short, and hard, with glossy reflections, and the quills or stems strong and elastic. Body in hand short and very hard, and the general carriage upright, quick, fierce, and sharp. The back is best rather curved, provided it be flat *crosswise*, and not hump-backed or lop-sided. Weight for exhibition,  $4\frac{1}{2}$  to  $5\frac{1}{2}$  lbs.; for the pit, not over  $4\frac{1}{2}$  lbs.

"The hen should correspond in form, but of course in proportion, *hardness* of flesh and feather, with shortness of body, being main points. Good hens generally become spurred, and such breed the hardest and best cocks. The proper weight of a hen is from 3 to  $3\frac{1}{2}$  lbs.

"A short or clumsy head, short or soft neck, long body, narrow shoulders, long thighs, legs set close together, loose or soft plumage, and especially what is known as a 'duck foot,' are serious defects. It should be remembered that a Game fowl is *always* judged mainly in reference to its fighting qualities, and anything which interferes with them is a fault in the bird.

"The best criterion of blood in all Game fowls is the *colour of the eyes*, a point which has been, strange to say, totally overlooked in every work on poultry hitherto published. *Black* eyes show dark blood, and the hens of such strains lay white eggs. *Red* eyes denote red blood, and lay pinkish eggs. *Yellow* or *daw* eyes lay yellowish eggs. These last are inferior in spirit to the others. Brown and bay eyes result from crossing different breeds."

Their merits are many and various. In elegance of shape, in hardihood, in bold and fearless spirit, what can equal them? But besides these recommendations, they rank, as already stated, in the very first class as layers, provided only they have a good run; whilst for delicacy of flavour their flesh is, confessedly beyond any comparison. They should never be fattened, being too impatient to bear the process; but if eaten just as taken off their runs, are equal to the pheasant. They also eat little, and are therefore profitable fowls, whilst as mothers, the hen is not to be equalled. She should not be given too many eggs, on account of her small size; but she will hatch her full complement, and when hatched will take good care of them, defending them against *any* foe to the last gasp. If there be cats in the neighbourhood commend us to a good Game hen.

There are, however, a few drawbacks. The size of both birds and eggs is small, which of itself makes them of little value as a market fowl, and in confinement the Game hen will by no means lay so well as Brahmas, Spanish, or Hamburgs. Their pugnacious disposition also disqualifies them for small runs, though not to the extent generally supposed.

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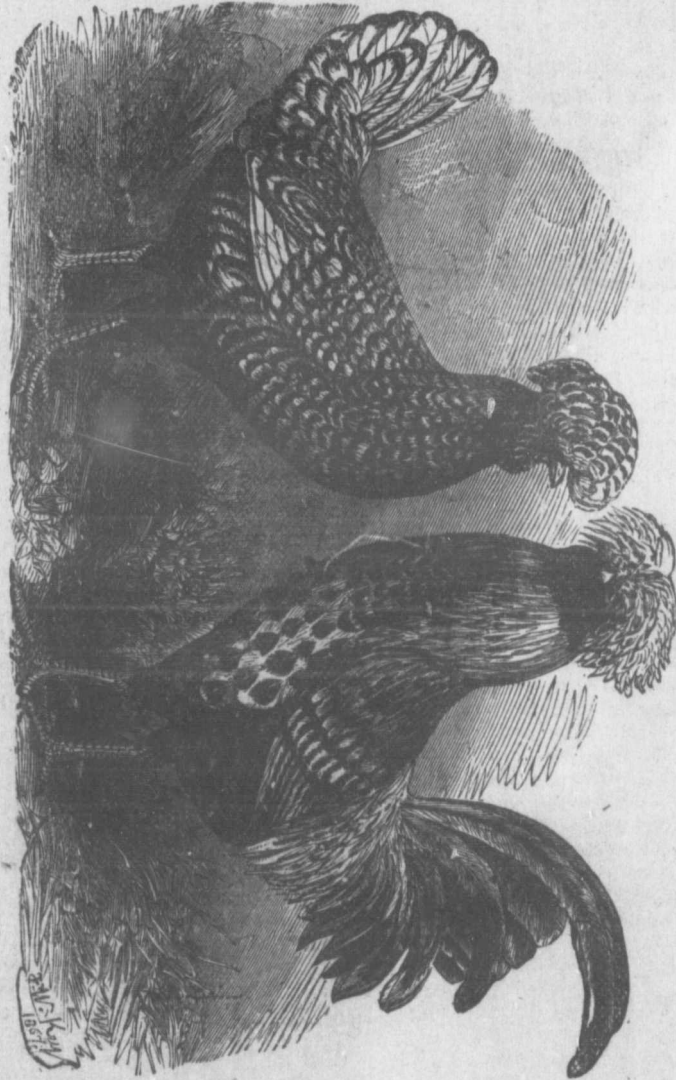
SILVER SPANGLED POLANDS.

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## POLANDS.

Under the title of Poland, or Polish fowls, should be collected all varieties which are distinguished by a well-developed crest, or tuft of feathers on the top of the head. This crest invariably proceeds from a remarkable swelling or projection

SILVER SPANGLED POLANDS.



at the top of the skull, which contains a large portion of the brain; and it is worthy of remark, that as the comparative size of this protuberance invariably corresponds with that of the crest springing from it, the best crested chickens can be selected even when first hatched. It is also remarkable that the feathers in the crest of the cock resemble those of his neck-hackles, being long and pointed, whilst

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those of the hen are shorter and round ; and this difference forms the first means of distinguishing the sexes.

The comb of all Polish fowls is likewise peculiar, being what is called the two-horned character. This formation is most plainly seen in the Crèvecoeurs, where the two horns are very conspicuous. In the breeds more especially known as Polish, the comb should be almost invisible, but what there is of it will always show the bifurcated formation.

## SILVER SPANGLED.

In this variety the ground colour of the plumage is a silver white, with well-defined moon-shaped black spangles. In the cock, the hackle feathers are white, edged and tipped with black ; in the hen each hackle feather should have a spangle on the end. Tail feathers clear white, with a large spangle on the ends. The spangling on the wing coverts should be large and regular in both sexes, so as to form two well-defined bars across each wing. The proper spangling of the breast is very important. Many cocks are nearly black on the upper part, which is a great fault.

The crest feathers are black at the base and tip, with white between. Crest to be full and regular, showing no vacancy in the centre. A few white feathers usually appear after the second moult in the very best bred hens, and in old birds are not a disqualification, though certainly a fault.

Ear-lobes small and white ; wattles none, being replaced by a black or spangled beard.

The size of this breed is very good, weight of the cock six to seven and-a-half pounds ; hens four to five and-a-half pounds.

All the bearded Polands are rather liable to grow up "hump-backed," or "lob-sided" in the body. Of course either defect is a fatal disqualification.

Some special precautions are necessary in rearing Polish chickens. The prominence in the skull, which supports the crest, is never completely covered with bone, and is peculiarly sensitive to injury. On this account Cochins, or other large heavy hens should never be employed as mothers. A game hen will be the best. The young also fledge early and rapidly, and usually suffer severely in the process ; they therefore require an ample allowance of the most stimulating food, such as hempseed, meat and bread steeped in ale ; and, above all, they *must* be kept dry.

Polands have certainly solid merits. They improve in appearance, at least up to the third year. In a favourable locality they are most prolific layers, never wanting to sit, and the flesh is remarkably good. They appear also peculiarly susceptible of attachment to their feeders. And lastly, they suffer remarkably little in appearance or condition from exhibition.

Their great fault is a peculiar tendency to cold and roup—the white-crested black variety being the most delicate of all. The dense crest becomes during a shower saturated with water, and the fowls are thus attacked in the most vital part. No birds are so affected by bad weather. In exposed or damp situations they will die off like rotten sheep, and it is hopeless to expect any return. They can only be kept successfully in warm, genial situations, on well-drained ground, with a chalk or sand sub-soil, and with ample shelter to which they can resort during showers. In such circumstances they will do well, and repay the owners by an ample supply of eggs.

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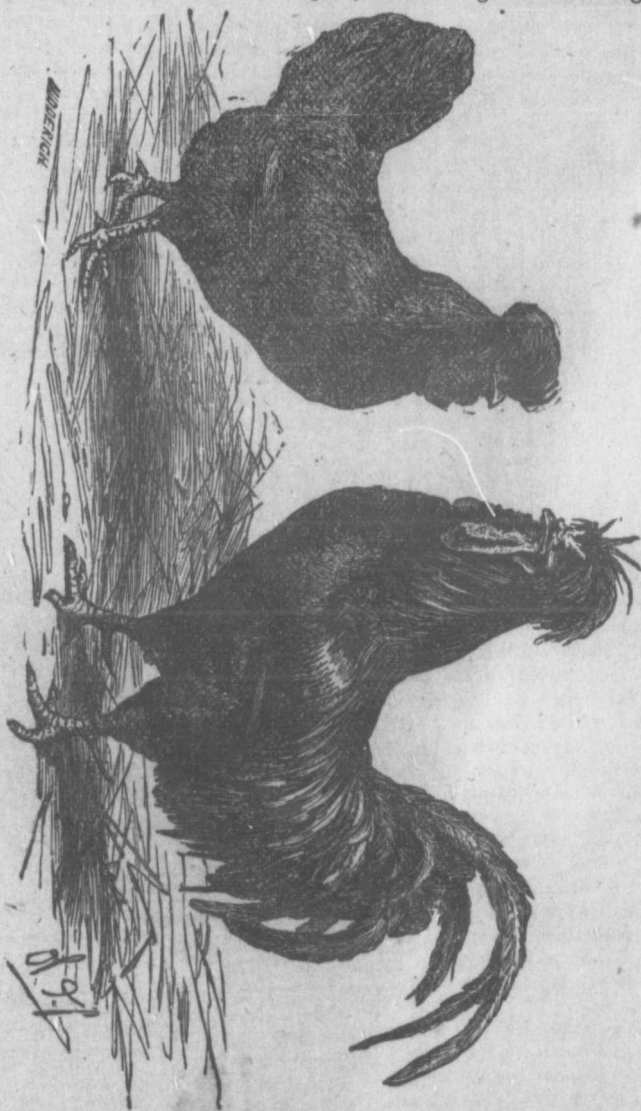
CRÈVECOEURS.

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CREVECCEURS.

This breed has been the longest known in England, and is one of the most preferred in France for the quantity and quality of its flesh. The full-grown cock will not unfrequently weigh 10 pounds, but 7½ to 8 pounds is a good average. In form the Crève is very full and compact, and the legs are exceedingly short,



especially in the hens, which appear almost as if they were creeping about on the ground. In accordance with this conformation, their motions are very quiet and deliberate, and they appear the most contented in confinement of any fowls we know. They do not sit, or very rarely, and are tolerable layers of very large white eggs. The comb is in the form of two well-developed horns, surmounted by a large

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black crest, and giving the bird a decidedly "diabolical" appearance. Wattles full, and, like the comb, a very dark red. The throat is also furnished with ample whiskers and beard.

Plumage mostly black, but in the largest and finest birds not unfrequently mixed with gold or straw on the hackle and saddle. Which is to be preferred will depend upon circumstances. Judges at exhibitions always prefer a pure black all over; and if the object be to obtain prizes, such birds must of course be selected both for breeding and show purposes; at the same time we should fail in our duty were we not distinctly to record our opinion that such a choice is most unfortunate, as the golden-plumaged birds are generally by far the largest and finest specimens. It should be remembered that the French have mainly brought these breeds to perfection by seeking first the *useful* qualities, and if our "feather-breeding" propensities be applied to them, we much fear that uniformity will only be attained at the price of the deterioration of the strain in size and real value.

The merits of the Crève consist in its edible qualities, early maturity, the facility with which it can be both kept and reared in confinement, and the fine large size of its eggs. The hen is, however, only a moderate layer, and the eggs are often sterile, while the breed is rather delicate in this country, being subject to roup, gapes, and throat diseases. This delicacy of constitution appears to improve somewhat as the fowls get acclimatised, and we should, therefore, recommend good English-bred rather than imported birds. Altogether, we do not recommend the Crève as a good breed for general domestic purposes; but it is certainly a splendid fowl for either table or market, and as such, especially on a large scale, in favourable localities, will repay the breeder.

Our engraving was drawn in France from remarkably good and perfect specimens.

#### LA FLECHE.

In appearance this breed resembles the Spanish, from which we believe it to have been at least partly derived. It exceeds that breed, however, in size, the cock often weighing from eight to even ten pounds. Both sexes have a large, long body, standing on long and powerful legs, and always weighing more than it appears, on account of the dense and close-fitting plumage. The legs are slate-colour, turning with age to a leaden grey. The plumage resembles the Spanish, being a dense black with green reflections.

The look of the head is peculiar, the comb being not only two-horned, much like the Crève-cœur, near the top of the head, but also appearing in the form of two little studs or points just in front of the nostrils. The head used to be surmounted by a rudimentary black crest, but English fanciers very soon bred this out, and the presence



La Fleche Cockerel.

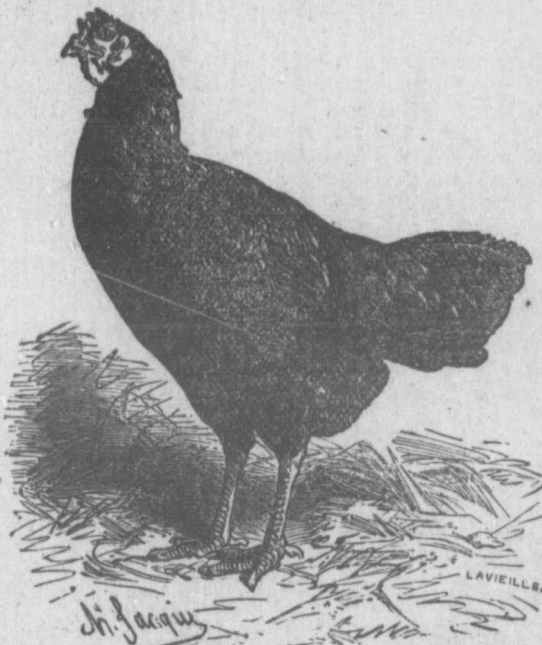
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of crest is now considered a disqualification at all good shows. The wattles are very long and pendulous, of a brilliant red colour, like the comb. The ear-lobes are dead white, like the Spanish, and exceedingly developed, meeting under the neck in good specimens. In fact, no breed could show stronger traces of its Spanish origin.

The appearance of the La Flèche fowl is very bold and intelligent, and its habits active and lively; at the same time it does not appear to thrive well in our climate. The hen is an excellent layer of very large white eggs, and does not sit. The flesh is excellent, and the fine, white transparent skin, makes a very favourable appearance on the table, which is only marred by the dark legs. The breed is, however, very delicate and does not lay well in winter, except in favourable circumstances. Altogether, it is decidedly less suitable than the preceding for domestic purposes, but still most valuable as a table fowl. As an egg-producer, it is as nearly as possible similar to the Spanish, not only in the size and number of the eggs, but the seasons and circumstances in which they may be expected. In juiciness and flavour the flesh approaches nearer to that of the Game Fowl than any other breed we know.

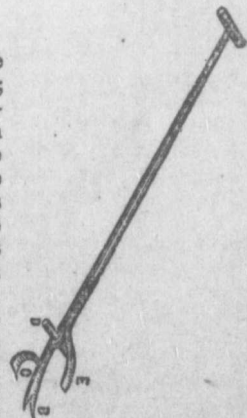


La Flèche Pullet.

The cocks suffer much from leg weakness and disease of the knee-joint, and do not bear the fatigue and excitement of exhibition so well as most fowls. They require, therefore, special care, and the moderate use of stimulants.

#### THISTLE DIGGER.

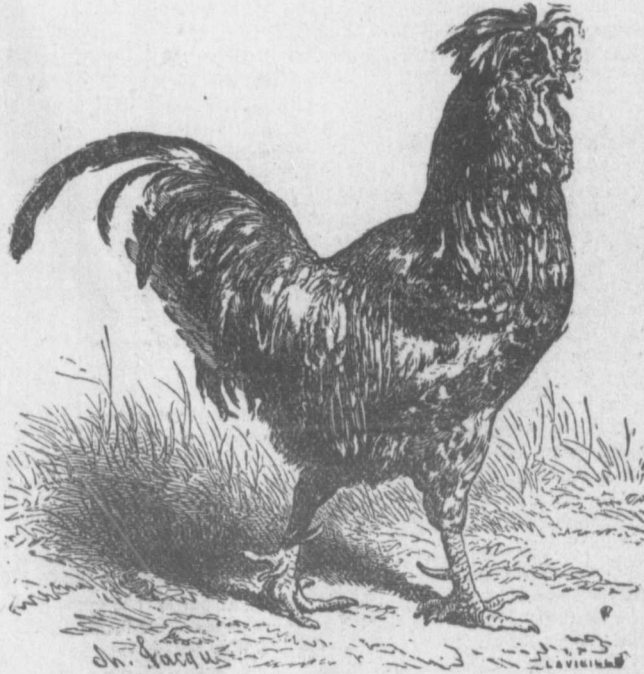
The Digger is easily made, cheap and lasting. A. is the handle; B. the claws, between which the thistle is received; the curved iron C. is the fulcrum by means of which a purchase is obtained for extracting the root. D. is an iron rod or bar, upon which the foot is placed to thrust the claws into the ground. In case the root of the thistle breaks, while endeavouring to extract it, the implement is inverted and the curved blade E., which has a chisel-like end, is thrust into the ground in order to cut off the root some inches from the surface, and thus prevent it from vegetating. When the ground is a little moist or loose, this implement, in the hands of an active man, will take out a large number of plants. It is the cheapest way to get rid of it. Boys like the sport of prying up the plants, and the implements should be made light and handy, so as to give them a play at "the thistle business," whenever they feel inclined.



Thistle Digger.

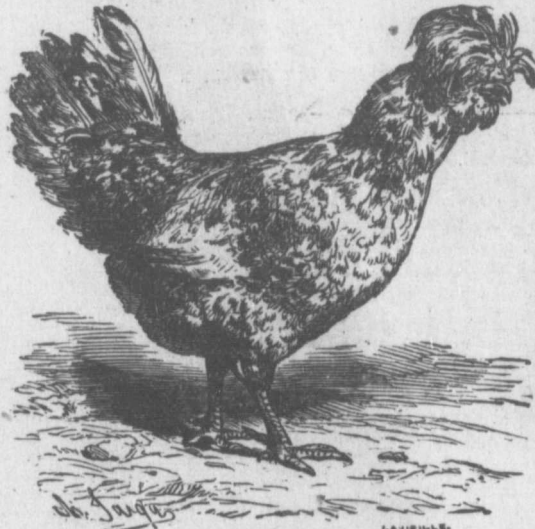


## HOUDANS.



Houdan Cock.

certainly like to see the spangling reduced in size of the markings, but sincerely hope this will not be sought at the expense of weight, in which the Houdan is



Houdan Hen.

centre; in the hen it should be very small and rudimentary.

This fowl in many respects resembles the Dorking, and Dorking blood has evidently assisted in its formation. We believe that a cross between the latter and a white Poland would not be very wide of the mark. Houdans have the size, deep compact body, short legs, and fifth toe of the Dorking, which in form they closely resemble, but with much less offal and smaller bones. The plumage varies considerably, but is most usually white, with large black spangles, the size of a shilling in many specimens. We should

pre-eminent among the French breeds. We feel certain that by breeding for this more useful quality the fowl may be reared to a greater weight than even the coloured Dorking; we have ourselves seen hens which weighed ten pounds, but such a size is not common, and very small specimens are more often seen at exhibitions than of the other French varieties.

The head should be surmounted by a good Polish crest of black and white feathers. The wattles are pendent and well developed, and the comb is the most peculiar in formation of all the French breeds, resembling, as has been said, the two leaves of a book opened, with a long strawberry in the

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## DUCKS,

Being strictly water birds, it appears unnatural to keep them from their proper *habitat*; however, they will do well in a garden or any other tolerably wide range where they can procure plenty of slugs and worms, with a pond or cistern only a



ROUEN AND AYLESBURY DUCKS.

few feet across. Kept in this manner, they will not only be found profitable, but very serviceable; keeping the place almost free of those slugs which are the gardener's great plague, and doing but little damage, except to strawberries, for which

fowl in respects resembles the Dorking and Dorking was evident in its on. We believe that a cross in the latter white Poulton could not be side of the Houdans size, deep t body, eggs, and e of the , which in ey closely , but with is offal and ones. The varies ably, but usually with large angles, the a shilling y speci- ve should sincerely oudan is ng the feel cer- g for this the fowl greater e colour- ve our- h weigh- ; such a and very e more ibitions French

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they have a peculiar partiality, and which must be carefully protected from their ravages. Other fruit is too high to be in much danger.

In such circumstances there can be no doubt whatever that ducks are profitable poultry; and where numerous fowls are kept, a few should also be added, as they will keep themselves, very nearly, on what the hens refuse; but where every atom of the food they consume has to be paid for in cash, our own opinion is that ducks do not pay to rear except for town markets, their appetites are so everlasting and voracious. This point, however, we must leave to the experience of the reader, and proceed to consider the two principal varieties—known as the Aylesbury and Rouen. The following descriptions and accompanying remarks are from the pen of Mr. John K. Fowler, of Aylesbury, one of the largest poultry-breeders, and certainly the most successful exhibitor of ducks, in England:—

“My idea of a perfect Aylesbury drake and duck is, that in plumage they should be of the purest snow white all over. The head should be full, and the bill well set on to the skull, so that the beak seem to be almost *in a line* from the top of the head to the tip. The bill should be long, and when viewed in front appear much like a woodcock's; it should be in prize birds of a delicate flesh colour, without spot or blemish, and with a slight fleshy excrescence where the feathers commence. If it occasionally has a very slight creamy tint it would not disqualify, but any approach to dark buff or yellow is fatal to the pen. Eye full, bright, and *quite black*.

“The legs should be strong, with the claws well webbed, and in colour of a rich dark yellow or orange. Body rather long, but broad across the shoulders, and the neck rather long and slender. The drake should have one and sometimes has two sharp curls in his tail.

“The weight of each bird in a show pen ought to be about nine pounds, but this is not very often attained.

“In selecting breeding stock, drakes should be chosen with very long bills, like a woodcock's, and ducks with broad backs and large, solid bodies.”

“Rouen Ducks,” Mr. Fowler states, “are reared much the same as Aylesbury, but are not nearly so forward, rarely laying till February or March. They are very handsome, and will weigh eight or nine pounds each; and, *as a rule*, do much better in most parts of England than the Aylesburys. Their flesh is excellent, and at Michaelmas is, I think, superior to the other.

“The best general description of the Rouens in plumage is to be precisely like the wild mallard, but larger. The drake should have a commanding appearance, with a rich green and purple head, and a fine long bill, formed and set on the head as I have described for the Aylesburys. The bill should look *clean*, of a yellow ground, with a very pale wash of green over it, and the ‘bean’ at the end of it jet black. His neck should have a sharp, clearly-marked white ring round it, not quite meeting at the back. Breast a deep rich claret-brown to well below the water-line, then passing into the under body-colour, which is a beautiful French grey, shading into white near the tail. The back ought to be a rich greenish black quite up to the tail feathers, the curls in which are a rich dark green. Wings a greyish brown, with distinct purple and white ribbon-mark well developed. The flight-feathers must be grey and brown—any approach to white in them is a fatal disqualification, not to be compensated by any other beauty or merit. Legs a rich orange. Nothing can exceed the beauty of a drake possessing the above colours in perfection.

“The bill of the duck should not be so long as in the drake, and orange brown as a ground colour, shading off at the edges to yellow, and on the top a distinct splash, or mark of a dark colour approaching black, two-thirds down from the top; it should there be rounded off, and on no account reach the sides. I may also remark that any approach to slate colour in the bills of either sex would be a fatal blemish. The head of a duck is dark brown, with two distinct light brown lines running along each side of the face, and shading away to the upper part of the neck. Breast a pale brown, delicately pencilled with dark brown; the back is exquisitely pencilled with black upon a moderately dark brown ground. The shoulder of the wing is also beautifully pencilled with black and grey; flight-feathers dark grey, any approach to white being instant disqualification; and ribbon-mark as in the drake. Belly, up to the tail, light brown, with every feather delicately pencilled to the tip.

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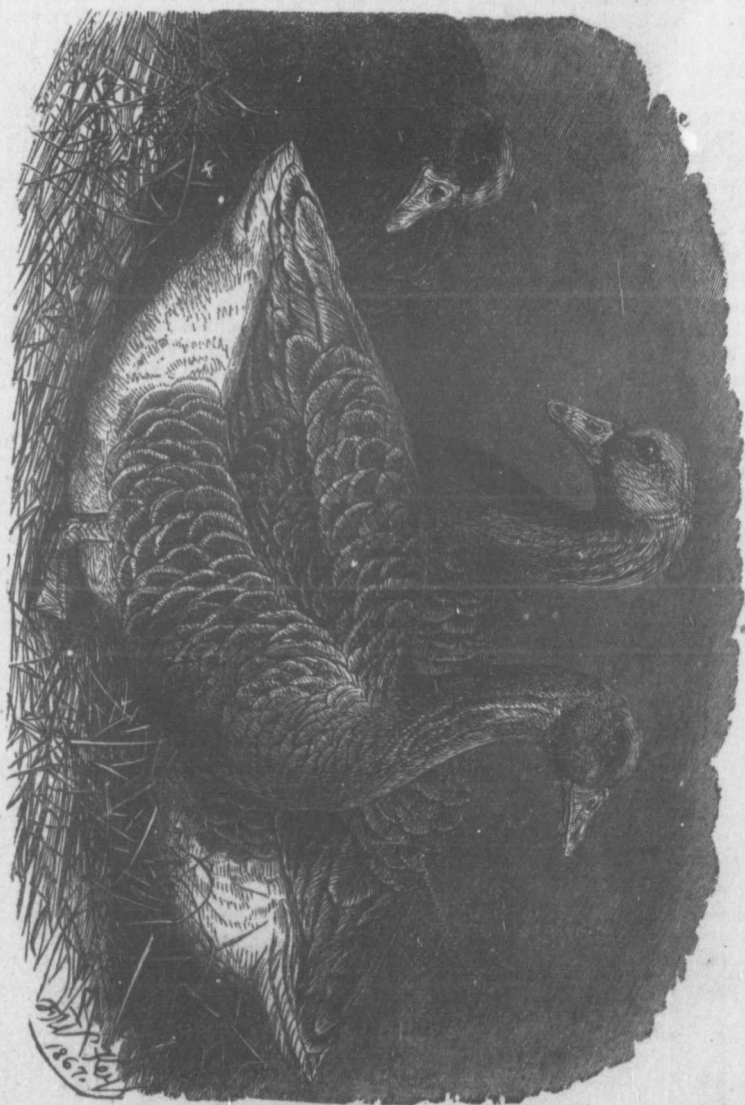
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Legs orange, often, however, with a brown tinge. The duck sometimes shows an approach to a white ring round the neck, as in the drake; such a *good judge* would instantly disqualify."

Our illustration is drawn from the Birmingham prize birds of last year.

GEESE.



TULOUSE GESE.

"Of the two principal breeds of geese," Mr. Fowler writes, "I very much prefer the Grey or Toulouse to the White or Embden, being larger and handsomer. I have had a Toulouse gander which weighed thirty-four pounds, a weight never, I am sure, attained by the White breed. They are also better shaped, as a rule, and in

every way the more profitable variety. The forehead should be flat, and the bill a clear orange red. The plumage is a rich brown, passing into white on the under parts and tail coverts."

With regard to the general management of geese, little need be said. More than four or five should not be allowed to one gander, and such a family will require a house about eight feet square; but to secure fine stock, three geese are better to one male. Each nest must be about two feet six inches square, and, as the goose will always lay where she has deposited her *first* egg, there must be a nest for each bird. If they each lay in a separate nest the eggs may be left; otherwise, they should be removed daily.

Geese should be set in March or early April, as it is very difficult to rear the young in hot weather. The time is thirty to thirty-four days. The goose sits very steadily, but should be induced to come off daily and take a bath. Besides this, she should have in reach a good supply of food and water, or hunger will compel her, one by one, to eat all her eggs. The gander is usually kept away; but this is not very needful, as he not only has no enmity to the eggs or goslings, but takes very great interest in the hatching, often sitting by his mate for hours.

The goslings should be allowed to hatch out entirely by themselves. When put out, they should have a fresh turf daily for a few days, and be fed on boiled oatmeal and rice, with water from a pond, in a very shallow dish, as they should not be allowed to swim for a fortnight, for which time the goose is better kept under a very large crate. After two weeks they will be able to shift for themselves, only requiring to be protected from very heavy rain till fledged, and to have one or two feeds of grain daily, in addition to what they pick up.

For fattening, they should be penned up half-a-dozen together in a dark shed and fed on barley meal, being let out several hours for a *last bath* before being killed, in order to clean their feathers.

"For exhibition," Mr. Fowler says, "all geese should be shut up in the dark, and fed liberally upon whole barley or oats thrown into water. It is essential to great weight to keep them very quiet, letting them out in the water, however, for half an hour every day."



Design for a Country Church.

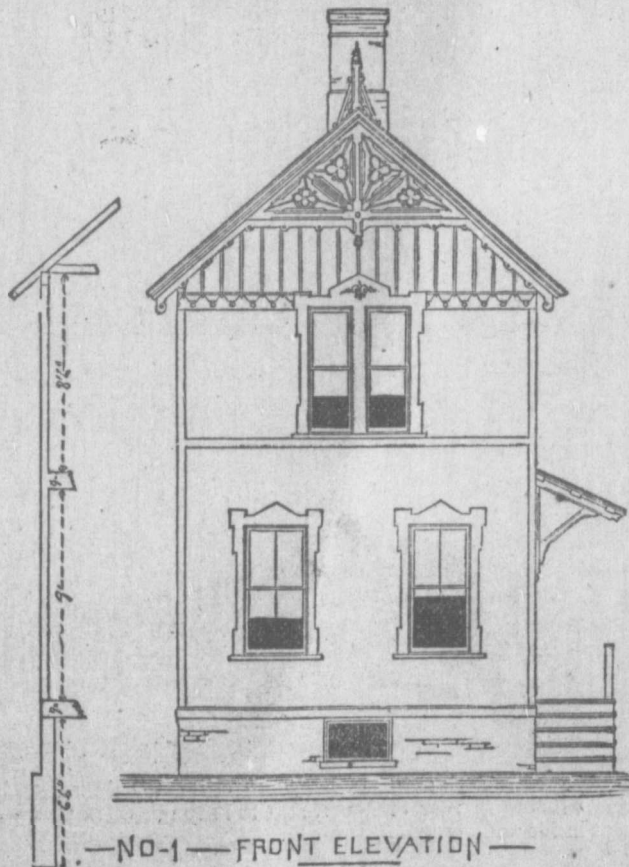
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## CHEAP COTTAGES.

## DESIGN No. 1.

The arrangement of the rooms, and the general finish, both internal and external, is sufficiently shown on the accompanying drawings as to need little explanation.

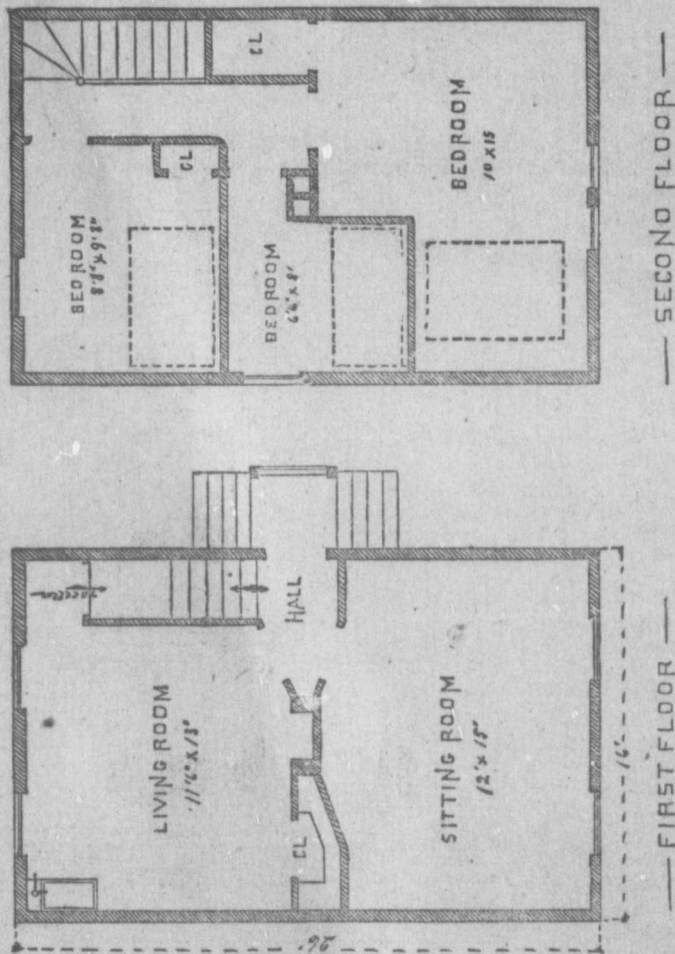
The following is a general explanation for design No. 1:—The ground to be excavated for cellar under whole house, wall to be of stone to top of ground, and continued with brick to given height, sills and steps to be of blue stone, walls to be plastered with two coats. The timber to be of spruce, of the following dimensions:—Sills, 4 x 9 inches; posts, 4 x 6 inches; plates, 4 x 6 inches; interties, 4 x 6 inches; first tier of beams, 2 x 9 inches, 20 inches from centres; second tier, 2 x 9 inches, 16 inches from centres; ceiling beams, 2 x 7 inches; rafters, 3 x 4 inches; all studding 2 x 4 and 3 x 4 inches, placed alternately 16 inches from centres. Flooring for first and second floors to be of matched pine 1 inch thick and 9 inches wide; the attic may be rough. Roof to be laid with good quality pine shingles; siding to be of good quality 5 inch pine clapboards; gables to be finished vertically, with ornamental work as shown on elevation. Principal stairs to be of pine, finished with newel, rail and balusters; cellar stairs of spruce. All frames to be 1½-inch pine, sills 2 inches, sashes 1½ inches, to have weights and cords, and outside rolling blinds. Doors to



SECTION



be of width shown on plans; 6 feet 8 inches in height,  $1\frac{1}{2}$  inches thick, four-panelled sunk mouldings, provided with proper locks and porcelain furniture; hall door to be 2 inches thick, and to have head light over it. An opening to be made



PLANS FOR DESIGN NO. 1.

in ceiling of second story, with sliding cover, to gain access to attic, which will have window in rear of house, also to have scuttle in roof. Two good coats of paint inside and out.

If you want to sell your farm, or if you have more seed grain than your neighbours can use, or if you have thoroughbred stock for sale, advertise in *THE WEEKLY MAIL*, 20 words for 50 cents each insertion, and  $2\frac{1}{2}$  cents for each additional word.

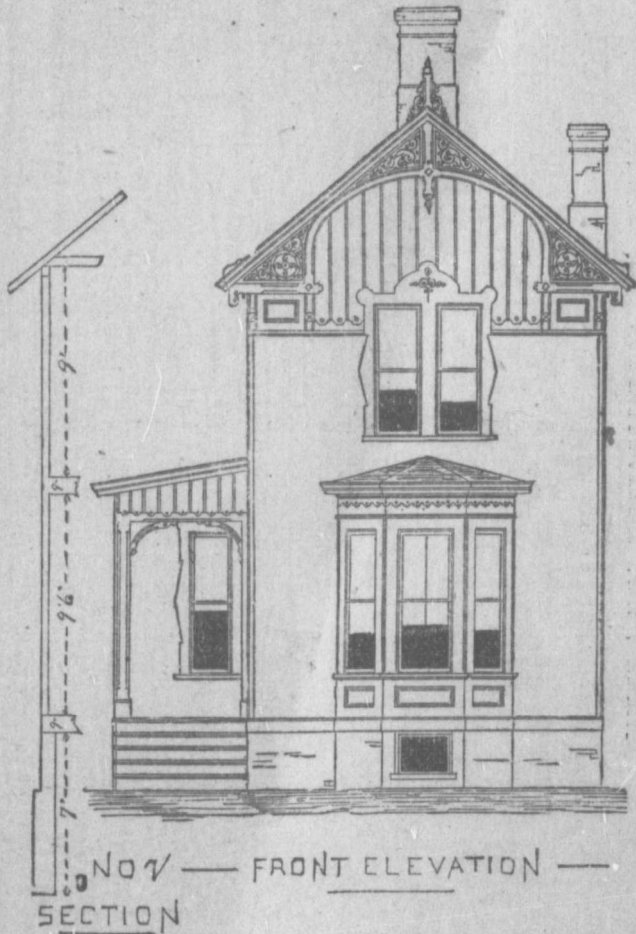
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## DESIGN No. 2.

This design is calculated to meet the wants of a large class of our population. The arrangement of the rooms, and the general finish, both internal and external, is sufficiently shown on the accompanying drawings as to need little explanation. The cellar to be excavated under whole house 7 feet in clear; walls to be same as No. 1. To have three cellar windows; sills, cellar steps, and hearth to be of blue stone; walls to be plastered three coats; two centre-pieces on first floor, also neat cornice in parlour.

Timber to be of size and quality same as No. 1. Flooring to be matched pine 1 inch thick, 9 inches wide; veranda floor,  $1\frac{1}{4}$  inches by  $4\frac{1}{2}$  inches. Roof to be of good quality pine shingles. Roofs of extension and bay windows to be laid with hemlock boards and then covered with charcoal roofing tin, and provided with necessary tin leaders. Siding to be 5-inch pine clapboards, with vertical siding in gable, as per elevation; scroll work to be  $1\frac{1}{2}$  inches thick, the remainder to be 3 inches thick, chamfered as shown. Stairs to be of pine, and to have newel rail and balusters of walnut. All frames to be  $1\frac{1}{2}$  inches; sills 2 inches; sashes,  $1\frac{1}{2}$  inches; provided with pulleys and weights, and to have outside rolling blinds. Doors to be of width shown on plans; front door to be 2 inches thick, and to have glass panels at top; principal doors

on first floor to be  $1\frac{1}{2}$  inches thick, 7 feet high; on second floor,  $1\frac{1}{4}$  inches thick, 6 feet 8 inches high; all doors to be four-panelled, sunk mouldings, and to have proper locks and porcelain furniture. Inside trimmings to be of good quality pine, and on first floor to have 9-inch base,  $6\frac{1}{2}$ -inch architraves; on second floor, 7-inch base, 5-inch architraves. Closets to have an average of three shelves each. Parlour to have neat marble mantel; dining room and two rooms on second floor

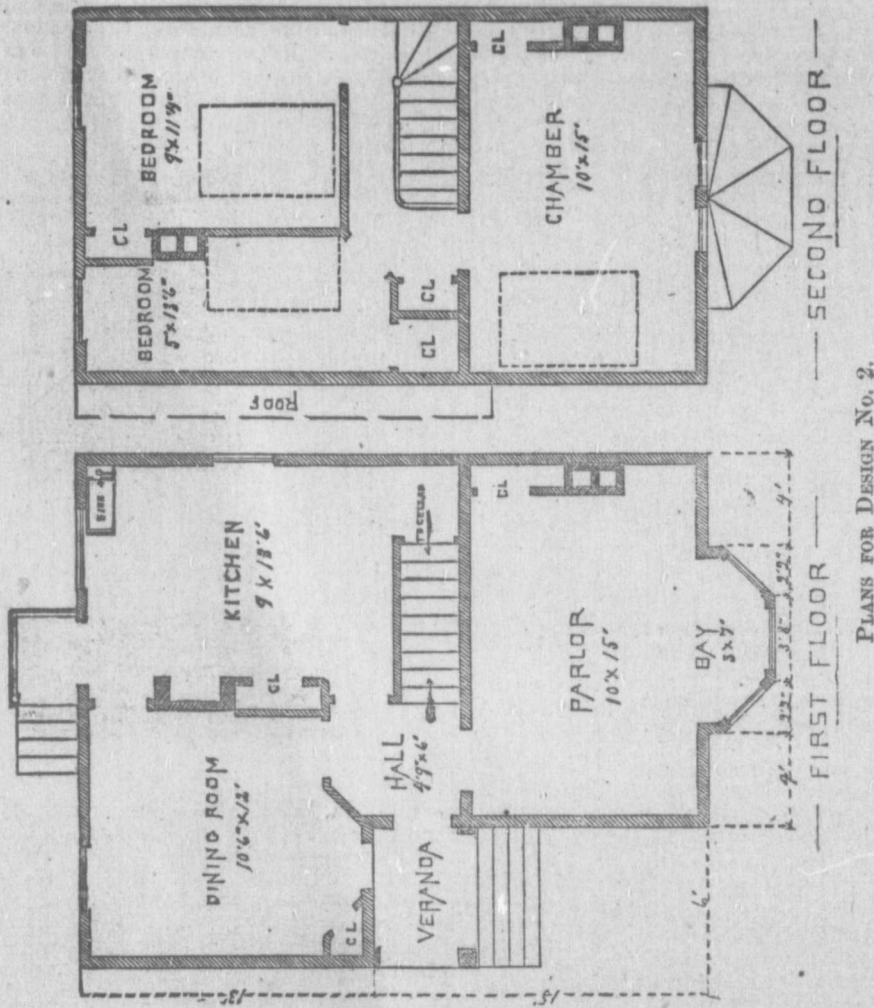


PLANS FOR DESIGN NO. 1.

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to have marble shelves and iron brackets ; kitchen to have wooden mantel. Pump and sink in kitchen ; also gas pipes throughout. An opening to be made in ceiling



of second story, with window in rear of house, and scuttle in roof. Two good coats of paint inside and out, in colour as directed.

The Weekly Mail, going as it does into the families of all the leading Conservatives of the Dominion, should be used by them as a family record. Notices of Births, Marriages, and Deaths are inserted in THE WEEKLY MAIL for 50 cents.

There are needlework Modern all made of in description composed of a silver is usual way flat embro It is made guished finished thread. be round, prevent the and forward a plait of various w least exp tarnishing tern or f other part ded any needlewo threads. terns ; an



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## ART NEEDLEWORK.

There are various forms in which gold and silver are prepared for the purposes of needlework, and also different colours, obtained by different degrees of oxidation. Modern alloys are more successful than those used in the last century, which, being made of inferior metals, tarnished after very short wear, and soon threw this description of embroidery into discredit. What is called "passing" is generally composed of a thread of silk, round which an extremely fine flattened wire of gold or silver is spun. The needle may be threaded with it in the usual way, and it can be used in the same manner as silk for flat embroidery; and also for knitting, netting and crochet. It is made of two or three different sizes, and is distinguished from gold cord by its being formed of only one thread. For embroidery with "passing" the needle must be round, very large in the eye, and sufficiently large to prevent the fraying of the gold as it is passed backwards and forwards through the work. Gold and silver braid is a plait of three or more threads, and can be purchased of various widths and qualities; the copper-gilt being the least expensive, but also the most to be avoided, from its tarnishing so soon. Braid can be used either for the pattern or for the ground, wool or silk being used for the other part. Gold and silver cord is a twist of two, or indeed any number of threads, but for the purposes of needlework it is seldom used of a larger size than four threads. It may be employed for edging braided work, and all flat embroidery patterns; and may also be formed into designs by itself. It is sewn on the work with



Fig. 1.

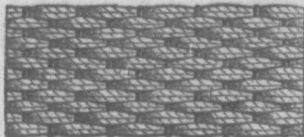


Fig. 2.

a fine needle, and silk of the same colour; and it is needful to use much care that the point of the needle does not penetrate

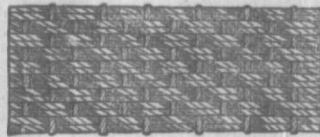


Fig. 3.

the metallic surface of the cord, and show the silk, which is its foundation. The needle is held very horizontally, in order to catch the cord where it touches the surface of the work; and fasten both together by as few threads as will possibly hold them firmly. Gold cord is much used as an edging for appliqué embroidery, on velvet, cloth or silk; and forms a most effective finish when employed for the veining of leaves and stems. Bullion is composed of fine wire twisted. There are three kinds—the smooth, the rough, and the checked; and they are sometimes used together in the same piece of embroidery in order to produce a richer appearance. The stems of flowers are also worked in bullion in some pieces of antique work; it is cut into the requisite lengths with the scissors, but the proper method of embroidering with it will require both experience and attention in its achievement.

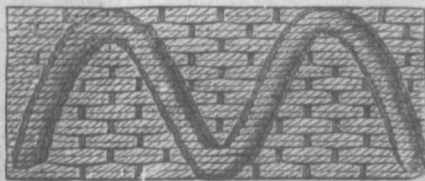


Fig. 4.

Spangles are small pieces of metal, punched in various shapes, from a thin sheet. A hole is pierced in the centre, through which the silk is passed to fasten them to the work. Tinsel may be bought in still thinner sheets, and is cut in strips or

M. Pump  
in ceiling

SECOND FLOOR

FIRST FLOOR

PLANS FOR DESIGN No. 2.

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ents.

shapes as needed. Both spangles and tinsel are mostly used for velvet, cloth, crêpe, and net embroidery.

It seems hardly necessary to mention beads, as they are so well known in knitting, netting and croquet-work.

If properly protected and used, both gold and silver may be preserved for any number of years. Fine gold, which is really silver-gilt, is less likely to become oxidised than merely gilt imitations grounded on the baser metals. A current of damp air, wet, noxious gases, and some perfumes will invariably tarnish and discolour every article exposed to them.

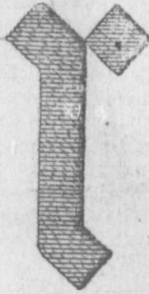


Fig. 5.

Armorial bearings and their accessories are almost a distinct branch of the art. The designs must be correct according to the laws of Heraldry's College, both as to their colour and form. The figures are raised by means of wool or cotton, in order to give them a rounded appearance. Coats-of-arms which have supporters are singularly effective when worked; and on ordinary ones the disposition of the mantling will require the utmost skill and taste of the designer to render it graceful and pretty.

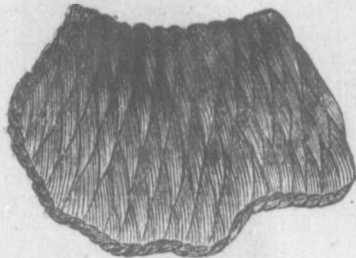


Fig. 7.

The different kinds of silk used in all ancient and modern work are called floss, crochet-twist, purse-silk, Dacca, Berlin, three-cord, and sewings. Floss appears to have been the silk usually employed in the antique work; it was laid in long or short perpendicular lines of various shades of colour, and kept down by rows of fine gold thread arranged in lines or patterns upon it. An example of this is seen in fig. 1, which was crimson floss with lines of gold. It could be thus made to represent the draperies



Fig. 8.

of figures, pavements in squares of marble, or the canopy of some sacred subject. If split very fine, floss was used both for flesh and hair of figures. Crochet-twist is a silk of three piles; it can be used in the manner described above for floss, and the perpendicular lines held down with fine sewing-silk. The name for this among embroiderers is "couching." Figs. 2 and 3 represent what is called "broad couching," the lines being either of gold-twist or purse-silk. They can also be laid diagonally, which form an effective background for a large design. Purse-silks, having an extremely regular twist, are much used by modern embroiderers for such designs as are used on alms-bags, sermon cases, and book-markers for large and heavy volumes.

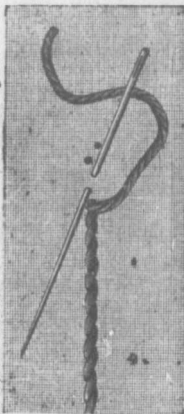


Fig. 9.

Fig. 4 shows a method of sewing the whip-cord in a pattern under the couching. This and kindred designs were much affected by the workers of the fifteenth and sixteenth centuries as a background, and were most effective in rendering effects of light and shade, especially in gold and silver embroidery.

The letter "r," at fig. 5, is an illustration of modern embroidery over card. There is very little to say about it, except that it requires greater regularity in laying the stitches with precision and evenness than in any other kind of work with silk or gold twist. Even as regards the twist of the silk or gold, great care must be used; for one stitch in which the twist was looser or tighter than its neighbour would ruin the appearance of the letter or the monogram. Rather short needlefuls of silk should be taken, as on the least roughness they must

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Fig. 12 sh  
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be changed, and a large-eyed needle will also be found a great economy. The stitch represented at fig. 6 is a flat example of the simple long stitch in which all floss embroidery is wrought, and is a sample of the way it should appear when finished. Fig. 7 is an endeavour to enlarge and magnify the same, so as to bring it

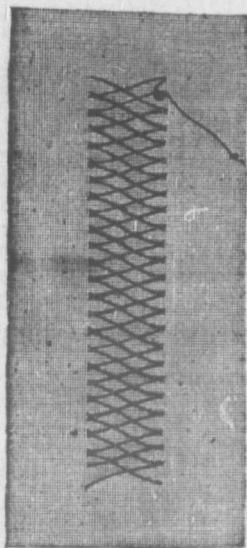


Fig. 10.

within the comprehension of the reader. It shows the method of working a leaf with the lightest shade, commencing from the other edge, and working downward into the darker, on the inside. The outline of this leaf is laid in crochet-silk, sewed with fine sewing silk.

Fig. 8 is a stem, worked in satin stitch embroidery.

The French knot is a stitch much used in silk and wool embroidery. It is very easy to make, but it will need some practice. The needle must be first brought up through the work at the exact spot where the knot is to be; then the thread is taken by the left hand, and held midway between the work and the needle, and the right hand twists the needle round it. Slide this loop

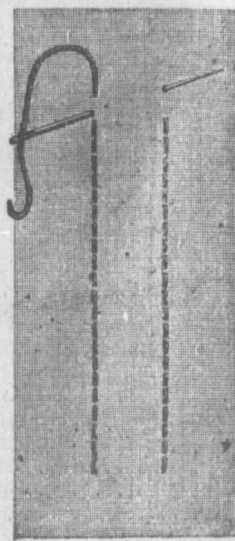


Fig. 11.

down to the point of the needle, and pass the needle again through the stuff, holding the knot firmly with the left hand, while the right draws the needle through underneath; and if held properly, after a little practice, the loop will settle into a knot on the top. It may be increased in size by the number of times the silk is twisted round the needle. These knots are most effective for the centres of flowers, and the Chinese sometimes execute large designs of needlework entirely in them; though I cannot say I admire the work of this description which I have seen.

Fig. 9 represents the outline stitch of crewel embroidery. It is, in reality, the stitch in which the crewel work is done also, the same idea being carried out with rather longer stitches on the surface, the criterion of good work being the small amount of wool shown on the wrong side. The old-fashioned manner of working was different, and consisted in making both sides equally presentable to view—in fact, I have frequently been shown specimens of which it was difficult to tell the right or wrong side. From one of these I copied the stitch shewn in figs. 10 and 11. It is intended for a border, and was worked as an edging to some handsome old curtains, embroidered in a design of purple grapes and green leaves. The stitch in question was done in purple crewels within an inch or so of the selvage. Fig. 10 shows the right side; it is, however, worked on the wrong, as shown in fig. 11. Scrolls are frequently used in silk embroidery. They may be formed with gold or silk twist, enriched with gold passings. Fig. 12 shows a knotted stitch for scroll work which is fully explained by the engraving, and will be found effective when worked.

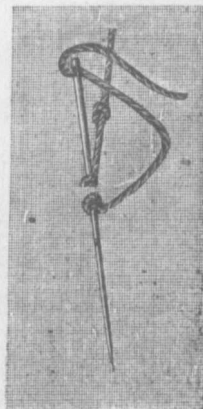
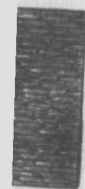


Fig. 12.

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# HOUSE OF COMMONS.

Returns of the General Election, held September 17th, 1878.

## ONTARIO.

Constituency.	Member Elect.	Votes.	Defeated Candidate.	Votes.
Addington	J. McRory	1,656..C	S. Shibley	1,244
Algoma	S. J. Dawson	885..C	A. Rankin	450
Bothwell	Hon. D. Mills	1,852..R	J. J. Hawkins	1,567
Brant, North	G. Fleming	931..R	J. S. Crawford	734
Brant, South	Wm. Patterson	1,496..R	Alfred Watts	1,298
Brockville	W. Fitzsimmons	1,033..C	J. D. Buell	906
Bruce, North	John Gillies	1,705..R	Alex. Sproat	1,549
Bruce, South	Alex. Shaw	2,673..C	Hon. E. Blake	2,598
Cardwell	Thomas White	1,218..C	Joseph Pattullo	961
Carleton	John Rochester	1,282..C	John May	1,196
Cornwall	Darby Bergin	575..	D. B. McLennan, Q. C.	537
Dr. Bergin was unseated and re-elected on the 26th January, by a majority of 176 over same opponent.				
Dundas	J. S. Ross	1,727..C	A. J. Laflamme	1,548
Durham, East	A. T. H. Williams	1,717..C	Lewis Ross	1,317
Durham, West	H. W. Burk	1,214..R	F. Cubitt	1,172
On Mr. Burk's resignation, Hon. E. Blake was elected by acclamation.				
Elgin, East	Thomas Arkell	2,168..C	Colin Macdougall	2,128
Elgin, West	George E. Casey	1,319..R	M. G. Munro	1,207
Essex	J. C. Patterson	2,596..C	William McGregor	2,318
Frontenac	J. A. Kirkpatrick	958..C	J. V. Ferris	145
Glengarry	John McLennan	1,330..C	A. McNabb	1,269
Grenville, South	J. P. Wiser	1,152..R	John Dumbrille	1,121
Grey, East	T. S. Sproule	1,664..C	A. Gifford	1,133
Grey, North	S. J. Lane	1,607..C	George Snyder	1,394
Grey, South	George Jackson	1,163..C	G. Landerkin	1,082
Haldimand	D. Thompson	1,566..R	N. F. Davin	1,400
Halton	Hon. W. McDougall	1,708..C	William McCraney	1,690
Hamilton	F. E. Kilvert	2,252..C	Æ. Irving	2,005
"	Thos. Robertson	2,214..C	A. T. Wood	1,981
Hastings, East	John White	1,373..C	W. C. Farley	1,299
Hastings, North	Hon. McK. Bowell	1,249..C	E. D. O'Flynn	1,008
On being called to the Cabinet as Minister of Customs, Mr. Bowell was re-elected by acclamation.				
Hastings, West	James Brown	1,306..R	Hon. L. Wallbridge	1,055
Huron, Centre	Horace Horton	1,732..R	Samuel Platt	1,361
On the retirement of Mr. Horton a new election took place with the following result:—				
Hon. R. J. Cartwright		2,002..R	S. Platt, Goderich	1,601
Huron, North	Thomas Farrow	1,933..C	William Sloan	1,849
Huron, South	M. C. Cameron	1,874..R	Robert Porter	1,709
Kent	R. Stephenson	2,502..C	H. McMahon	1,969
Kingston	Alexander Gunn	991..R	Sir J. A. Macdonald	847
Lambton	Hon. A. Mackenzie	2,707..R	J. A. Mackenzie	2,561
Lanark, North	D. Galbraith	992..R	Joseph Jamieson	949
On death of Mr. Galbraith Mr. McDonell defeated Mr. Jamieson by 80 votes.				
Lanark, South	J. G. Haggart	1,585..C	F. T. Frost	1,261
Leeds and Grenville, N.	C. F. Ferguson	859..C	F. Jones	823
Leeds, South	D. F. Jones	1,904..C	W. H. Fredenburg	1,783
Lennox	E. Hooper	1,358..C	Hon. R. J. Cartwright	1,299
Lincoln	J. C. Rykert	1,893..C	James Norris	1,799
London	John Carling	1,407..C	John Walker	1,343
Middlesex, East	D. McMillan	24,28..C	D. Glass	2,332

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Dr. Chr  
Bagot....

Constituency.	Member Elect.	Votes.	Defeated Candidate.	Votes.
Middlesex, North.....	T. Coughlin.....	1,629..C	R. C. Scatcherd.....	1,621
Middlesex, West.....	G. W. Ross.....	1,635..R	N. Currie.....	1,587
Monck.....	L. McCallum.....	1,459..C	J. D. Edgar.....	1,431
Muskoka.....	A. P. Cockburn.....	1,259..R	W. E. O'Brien.....	1,196
Niagara.....	P. Hughes.....	312..R	J. B. Plumb.....	319
This election came before the courts, and Mr. Hughes was disqualified, and the seat given to Mr. Plumb.				
Norfolk, North.....	J. Charlton.....	1,492..R	Aquila Walsh.....	1,348
Norfolk, South.....	William Wallace.....	1,327..C	H. W. Allen.....	1,310
Northumberland East.....	J. Keeler.....	1,799..C	J. S. Biggar.....	1,736
Northumberland, West.Hon. J. Cockburn.....	1,315..C	William Kerr.....	1,227	
Ontario, North.....	G. Wheeler.....	2,215..R	W. H. Gibbs.....	2,161
A petition against the return of Mr. Wheeler was entered, and the trial resulted in his disqualification, and the election was declared void. Since judgment was rendered the seat has remained vacant, the case having been taken to the Supreme Court.				
Ontario, South.....	F. W. Glen.....	1,867..R	Hon. T. N. Gibbs.....	1,661
Ottawa City.....	J. M. Currier.....	1,854..C	P. St. Jean.....	1,353
".....	J. Tasse.....	1,748..C	C. W. Bangs.....	1,239
Oxford, North.....	T. Oliver.....	1,706..R	J. H. Wood.....	803
Oxford, South.....	J. A. Skinner.....	1,915..R	Joseph Gibson.....	1,554
Peel.....	William Elliott.....	1,414..C	Robert Smith.....	1,325
Perth, North.....	S. R. Hesson.....	2,533..C	James Fisher.....	2,450
Perth, South.....	James Trow.....	1,796..R	E. Hornibrook.....	1,719
Peterborough, East.....	J. Burnham.....	1,262..C	Thomas Buck.....	1,236
Peterborough West.....	Geo. Hilliard.....	1,071..C	J. Bertram.....	874
Prescott.....	F. Routhier.....	875..C	A. Hagar.....	870
			Lt.-Col. Urquhart.....	661
Prince Edward.....	J. S. McCuaig.....	1,991..C	J. M. Platt.....	1,701
Renfrew, North.....	P. White, jun.....	1,273..C	J. Findlay.....	920
" South.....	W. Bannerman.....	962..C	R. Campbell.....	738
Russell.....	Hon. J. O'Connor.....	1,612..C	Ira Morgan.....	1,097
On accepting the Presidency of the Council Mr. O'Connor was re-elected by acclamation.				
Simcoe, North.....	D. McCarthy.....	2,943..C	H. H. Cook.....	2,893
" South.....	W. C. Little.....	1,137..C	Geo. Fletcher.....	694
Stormont.....	Oscar Fulton.....	1,082..C	C. Archibald.....	885
Toronto, Centre.....	Robt. Hay.....	1,631..C	J. Macdonald.....	1,141
" East.....	S. Platt.....	1,743..C	E. Galley.....	1,052
" West.....	Hon. J. B. Robinson.....	2,165..C	Thos. Hodgins.....	1,528
Victoria, North.....	Hector Cameron.....	917..C	Jas. MacLennan.....	741
" South.....	A. McQuade.....	1,705..C	John Connolly.....	1,281
Waterloo, North.....	Hugo Kranz.....	1,412..C	I. E. Bowman.....	1,279
" South.....	S. Merner.....	1,468..C	Jas. Young.....	1,424
Welland.....	C. W. Bunting.....	1,926..C	E. Hershey.....	1,810
Wellington, Centre.....	G. T. Orton.....	1,683..C	Mr. Robinson.....	1,677
" North.....	G. A. Drew.....	1,713..C	N. Higginbotham.....	1,605
" South.....	D. Guthrie.....	1,832..R	Jas. Goldie.....	1,529
Wentworth, North.....	Thos. Bain.....	1,343..R	Thos. Stock.....	1,237
" South.....	Joseph Rymal.....	1,169..R	F. M. Carpenter.....	1,095
York, East.....	A. Boulbee.....	1,526..C	Jas. Metcalfe.....	1,460
" North.....	F. W. Strange.....	1,792..C	A. H. Dymond.....	1,778
" West.....	N. C. Wallace.....	1,326..C	David Blain.....	1,124
QUEBEC.				
Argenteuil.....	T. Christie.....	919..R	J. J. C. Abbott.....	830
Dr. Christie was unseated for corrupt practices by agents.				
Bagot.....	J. A. Mosseau.....	1,387..C	J. B. Chagnon.....	1,226

Constituency.	Member Elect.	Votes.	Defeated Candidate.	Votes.	Constituency.
Beauce.....	J. Bolduc.....	1,523..I	Geo. Lessard.....	401	Sherbrooke
Beauharnois.....	J. G. H. Bergeron.	776..C	L. A. Sears.....	763	Soulanges..
			J. B. St. Amour....	28	Stanstead..
Bellechasse.....	A. Larue.....	1,042..R	G. Amyot.....	990	Temiscouate
Berthier.....	E. O. Cuthbert....	1,134..C	P. Bellevieau.....	915	Terrebonne
Bonaventure.....	P. C. Beauchesne..	Acc..C			Three Rivers
Brome.....	E. L. Chandler....	1,272..R	S. W. Foster.....	991	Two Mount
Chambly.....	P. B. Benoit.....	887..C	S. T. Willett.....	843	Vaudreuil
Champlain.....	H. Montplaisir....	1,673..R	N. Fuguere.....	527	Vercheres..
Charlevoix.....	J. S. Perrault....	1,077..C	X. Cimon.....	898	Yamaska..
Chateauguay.....	L. H. Holton.....	936..R	L. A. Seers.....	757	
Chicoutimi & Saguenay..	E. Cimon.....	1,453..C	J. B. A. Gagne.....	1,158	
Compton.....	Hon. J. H. Pope....	1,464..C	H. Leonard.....	796	Annapolis
Dorchester.....	F. F. Rouleau....	1,081..C	E. H. Marceau....	362	Antigonish
Drummond and					
Arthabaska.....	D. O. Bourbeau....	2,143..C	L. Rainville.....	1,981	Cape Breton
Gaspe.....	Hon. P. Fortin....	913..C	B. Le Boutillier....	116	"
Hochelega.....	A. Desjardins....	3,029..C	L. O. David.....	2,342	Colchester
Huntington.....	Julius Scriver....	Acc..R			Cumberland
Iberville.....	F. Bechar.....	929..C	Chas. Thibault....	700	Digby.....
Jacques Cartier.....	D. Girouard.....	1,010..C	T. A. R. Lafamme..	1,008	Guysboro'
Joliette.....	Hon. L. F. G. Baby.	1,264..C	F. B. Godin.....	905	Halifax....
Kamouraska.....	J. Dumont.....	1,254..R	C. F. Roy.....	1,245	"
Laprairie.....	A. Pinsonneault..	661..C	T. A. Longton.....	601	Hants.....
L'Assomption.....	H. Hurteau.....	1,021..C	C. L. Forrest.....	852	Inverness
Laval.....	J. A. Ouimet.....	Acc..C			
Levis.....	Hon. J. G. Blanchett	2,144..C	L. H. Frechette....	2,026	Kings.....
L'Islet.....	P. B. Casgrain....	687..R	C. Fournier.....	628	Lunenburg
Lotbiniere.....	C. J. Rinfret.....	1,083..R	L. A. Cote.....	972	Pictou.....
Maskinonge.....	F. Houde.....	838..C	A. L. Desaulniers..	296	"
			G. H. Yale.....	279	Queen's..
Megantic.....	L. E. Olivier.....	1,191..R	J. E. Turgeon....	881	Richmond
Missisquoi.....	G. B. Baker.....	1,355..C	G. Claves.....	1,209	Shelburne
Montcalm.....	Firmin Dugas....	698..C	N. Forest.....	374	
			I. B. Deslongchamps.	240	Victoria..
			V. J. E. Brouillet..	86	Yarmouth
Montmagny.....	A. C. P. R. Landry.	784..C	J. O. Carbonneau..	746	
Montmorenci.....	P. V. Valin.....	831..C	J. Langelier.....	605	Albert
Montreal, C.....	M. P. Ryan.....	2,624..C	B. Devlin.....	1,845	
"	E.....	C. J. Coursol....	F. X. Archambault..	3,234	Carleton
"	W.....	M. H. Gault.....	Wm. Darling.....	1,627	Charlotte
Napierville.....	S. Coupal.....	749..R	J. E. Bureau.....	617	Gloucester
Nicolet.....	F. X. Methot.....	1,759..C	G. Turcotte.....	1,018	Kent.....
Ottawa.....	A. Wright.....	3,025..C	J. A. Cameron.....	1,385	
Pontiac.....	J. Poupore.....	1,381..C	Thos. Murray.....	1,174	
Portneuf.....	R. P. Vallee.....	1,605..C	J. E. de St. Georges.	1,572	
Quebec, C.....	C. J. Malouin....	1,001..I	J. G. Ross.....	782	Kings..
"	E.....	Hon. W. Laurier..	J. Valliere.....	1,168	Northum
"	W.....	Hon. T. McGreevy			Queen's..
" County.....	A. P. Caron.....	1,702..C	E. Thibaudeau....	1,073	Restigouy
Richelieu.....	L. H. Massue.....	1,227..C	G. I. Barthe.....	1,117	St. John's
Richmond & Wolfe..	W. B. Ives.....	1,684..C	Hon. H. Aylmer....	1,069	"
Rimouski.....	J. B. Fiset.....	2,003..R	Hon. H. L. Langevin	1,554	St. John
Rouville.....	G. A. Gigault....	1,073..C			Sunbury
St. Hyacinthe.....	L. Tellier.....	1,181..C	H. Mercier.....	1,175	Victoria
St. John's.....	F. Bourassa.....	780..R	Charles Loupret....	583	Westmor
St. Maurice.....	L. S. Desaulniers..	811..C	S. J. Remington....	731	York..
Sheffield.....	Hon. L. S. Huntington	1,414..R	R. Nichols.....	1,186	
			M. Auger.....	272	



Votes.  
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Constituency.	Member Elect.	Votes.	Defeated Candidate.	Votes.
Sherbrooke	E. T. Brooks	Accc..C		
Soulanges	J. P. Lanthier	852..C	L. H. Masson	325
Stanstead	C. C. Colby	1,492..C	E. R. Johnson	738
Temiscouata	P. E. Grandbois	1,079..C	A. Pouliot	952
Terrebonne	Hon. L. F. Masson	1,194..C	A. B. Longpré	181
Three Rivers	Hon. H. L. Langevin	Acc..C		
Two Mountains	J. B. Daoust	791..C	J. A. Chagnon	11
Vaudreuil	J. B. Mongenais	764..C	R. W. Harwood	702
Vercheres	Hon. F. Geoffrion	935..R	M. E. Ducharme	880
Yamaska	Fabian Vanesse (C), elected on		Mr. Gill's resignation.	

NOVA SCOTIA.

Annapolis	A. Longley	1,305..C	W. H. Ray	1,298
Antigonish	A. McIsaac	833..R	C. B. Whidden	702
			J. J. McKinnon	315
Cape Breton	H. McLeod	2,057..C	N. LeG. Mackay	1,153
"	W. McDonald	2,051..C	W. Young	696
Colchester	T. McKay	1,829..C	A. C. Page	1,453
Cumberland	Hon. Chas. Tupper	2,030..C	W. T. Pipes	1,468
Digby	J. C. Wade	1,019..C	P. W. Smith	1,001
Guysboro'	A. Ogden	936..C	J. A. Kirk	772
Halifax	M. H. Richey	3,532..C	A. G. Jones	2,863
"	M. B. Daly	3,466..C	P. Power	2,695
Hants	W. H. Allison	1,662..C	M. H. Goudge	1,381
Inverness	S. MacDonnell	1,284..C	H. Cameron	1,175
			Angus McLennan	739
Kings	F. W. Borden	1,639..C	D. B. Woodworth	1,374
Lunenburg	C. E. Kaulback	1,899..C	E. Church	1,173
Pictou	Jas. McDonald	2,747..C	J. W. Carmichael	2,433
"	Robert Doull	2,681..C	J. A. Dawson	2,378
Queen's	S. T. R. Bill	670..C	J. T. Forbes	637
Richmond	E. P. Flynn	666..C	R. Benoit	552
Shelburne	T. Robertson	966..R	R. W. Freeman	899
			Thos. Coffin	198
Victoria	D. McDonald	748..R	C. J. Campbell	645
Yarmouth	F. Killam	1,343..R	T. B. Flint	802

NEW BRUNSWICK.

Albert	Alex. Rogers	684..R	John Wallace	596
			Gen. Domville	558
Carleton	G. H. Connell	1,766..C	S. B. Appleby	1,447
Charlotte	A. H. Gillmor, jr.	1,522..R	J. McAdam	1,284
Gloucester	Hon. T. W. Anglin	Acc..R		
Kent	G. A. Girouard	810..C	R. B. Cutler	726
			G. McLeod	510
			H. O'Leary	382
			M. McInernay	280
Kings	J. Domville	1,786..C	L. N. Sharp	1,452
Northumberland	J. B. Snowball	1,585..R	Peter Mitchell	1,384
Queen's	G. G. King	1,143..R	E. S. Wiggins	630
Restigouche	G. Haddow	Acc..I		
St. John, City & County	Hon. Isaac Burpee	2,686..R	G. E. King	2,180
"	C. W. Weldon	2,449..R	A. L. Palmer	1,981
St. John, City	Hon. S. L. Tilley	1,475..C	J. S. B. De Veber	1,466
Sunbury	C. Burpee	558..R	W. D. Perley	517
Victoria	J. Costigan	831..C	F. X. Bernier	368
Westmoreland	Hon. A. J. Smith	2,572..R	R. A. Chapman	1,928
York	J. Pickard	1,490..R	C. H. B. Fisher	834

MANITOBA.

Constituency.	Member Elect.	Votes.	Defeated Candidate.	Votes.
Lisgar.....	J. C. Schultz.....	Acc...C		
Marquette.....	Joseph Ryan.....	Acc...C		
Provencher.....	J. Dubuc.....	Acc...C		
Selkirk.....	D. A. Smith.....	555...R	Hon. Alex. Morris ...	546

BRITISH COLUMBIA.

Cariboo.....	J. S. Thompson.....	Acc...C		
N. Westminster.....	T. R. McInnes.....	388...I	J. Robinson.....	299
Vancouver.....	A. Bunster.....	336...C	D. W. Gordon.....	267
			A. McLennan.....	74
			J. Jessop.....	40
Victoria.....	Sir J. A. Macdonald.....	896...C	J. P. Davies.....	480
".....	Amor De Cosmos..	538...C		
Yale.....	Edgar Dewdney ...	Acc...C		

On Mr. Dewdney's resignation, Mr. F. Barnard (C) was elected.

PRINCE EDWARD ISLAND.

Kings.....	A. C. McDonald..	2,264...C	P. A. McIntyre.....	1,499
".....	E. B. Multart.....	2,077...C	M. McFayden.....	1,251
Prince.....	James Yeo.....	1,716...R	C. Howatt.....	1,605
".....	Ed. Hackett.....	1,655...C	S. F. Perry.....	1,491
Queen's.....	Hon. J. C. Pope..	3,275...C	Peter Sinclair.....	2,392
".....	F. de SteC. Brecken	3,102...C	Wm. McGill.....	2,272



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That our paper has gained for itself a reputation equalled by few and excelled by none is a fact that a glance at our large and ever increasing list of subscribers will substantiate. We are well pleased with the stand already attained by our paper, but we do not intend to stop here. Our aim is to be the

### LEADING PAPER IN CANADA,

and until we occupy that proud position, which we hope to ere long, we shall not rest satisfied. With this end in view we have had printed at a great outlay of time, trouble and money,

### 200,000 ELEGANT OIL CHROMOS

which we intend to give away with the paper. These are, unlike the majority of such pictures, not mere daubs, but works of art, and fit alike to adorn the walls of the humblest cottage or the grandest mansion in the land. There are but 50,000 sets, and these are going fast, therefore now is the time to beautify your home at a trifling cost. These Chromos are worked in real oil colors, size 12 x 16, and are called:

### KISS ME.

This darling picture shows a beautiful girl of about ten years of age, who has just stepped from the door of her home and picked up her darling pet puppy, and holding the cunning creature high in her hands, with its face close to her ruby lips, says "Kiss me." The face of this charming girl is radiant with beauty and love for her darling pet, while the little puppy looks so cunning and lifelike with his shaggy coat that you feel inclined to embrace both. At the feet of this charming girl sits the old mastiff, with his beautifully-colored shaggy coat, and tongue run out as natural as life, gazing upon the scene, with a satisfied expression upon his countenance, as much as to say, "I'll take care of and protect you both." Altogether it is one of the most beautiful pictures we have ever seen. The expressions are so lifelike that it seems as though you were gazing upon life itself instead of a picture.

We never yet showed this charming Chromo to a person that it did not draw an exclamation of admiration and an exclamation of "The darlings," "How natural," "So lifelike," &c., but we have not space to say more, and can only add that we hope you will soon be the possessor of this charming Chromo, which is given free, with three others, to any one who subscribes to the "HOUSEHOLD JOURNAL" for one year.

No. 2 is a fine Oil Chromo worked in real oil colors, size 12 x 16, entitled,

Votes.

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## WE ARE COMING.

And sure enough you would think they were, if you could see this beautiful picture. It will carry you back to your childhood's earliest and happiest days, when you knew no care, and your sunshiny faces contributed to the happiness of all around you. So it is with this picture. The moment one looks upon it their heart is touched with a love and affection. Their faces light up with a kindly, loving smile, and they are carried back to childhood's happy hours. But what is this picture? you will begin to ask, if we do not tell you at once. We wish it were possible for us to do so, but we cannot paint the loveliness of this beautiful Chromo with a pen. Nor can words convey any idea of its great beauty. A little in the distance stands one of those beautiful country houses, with grand and imposing shade trees, extending from the house to the road on each side of a broad drive-way. The house itself is of modern architecture. The grounds and garden around the house have an air of neatness and comfort which impresses you with the belief that the occupants are at least in very comfortable circumstances. But while the house, the trees, the neat fence and fine gravel walk are all really beautiful, we have not yet shown you the most beautiful part of this picture, and we feel that we are hardly able to find words to do the subject justice.

The old gardener, who has been at work in the garden among the plants and flowers, has been besieged by two beautiful children, a boy and a girl of tender years, who have been picking flowers, to give them a ride in his wheelbarrow, and the kind-hearted old man, always ready to please his pets, has taken them in and is wheeling them down the broad gravel drive-way through the open gateway, and the dear children covered with flowers, and as happy as it is possible for mortals to be, are having just the best time in the world, their bright, handsome faces beaming with joy and happiness. While the old man seems to enjoy the fun as well as the children, and the little pet dog runs beside the pair barking in the greatest glee, and now and then catching a flower and shaking it, as it drops from the laps of the children. The expressions of love and joy are shown on each face just as plainly as though you were looking at the group itself instead of a picture.

We can give but a faint idea of this masterpiece of art, but all agree, as soon as they see it, that they never have seen a sweeter or more lovely picture. No one can help loving it, and the desire to possess it is so strong that you will find people everywhere ready to subscribe to get this beautiful Chromo.

No. 3 is a sublime Old Chromo, in real oil colors, size 12 x 16, entitled

### THE VACANT CHAIR.

This beautiful picture tells its own story better than we can tell it by any description we may give. No one ever turns away from this Chromo with only a glance, but the minute they see it they are drawn towards it by its originality and beauty. It is so true to life, and each little point tells its story so truthfully that every one will prize it highly. It is regarded by art critics, as well as others competent to judge, as a wonderful work of art.

We will now endeavor to give you a faint idea of what the picture is like. This Chromo give the inside view of one of those old-fashioned country kitchens, with its large stone fireplace, its antique furniture, curtains, &c. Sitting by the table is an old lady neatly dressed in black, her handsome and shapely head partially covered with a neat lace cap. Her face is one of those noble, motherly faces, which no one can help loving and all admire. Upon the table stands a dish of apples, while in her hands she holds a knife and apple in the act of paring. At the back part of the room the outside door stands partially ajar, letting in a ray of soft, mellow sunlight across the floor. In this ray of sunlight stands the vacant arm-chair, where the old gentleman was wont to sit and enjoy the sunlight, gazing out upon the green fields. The hat and coat hang in the same place, and "The Vacant Chair" stands the same as though its occupant had only left for a few moments instead of for all time. The story is faithfully and truthfully told by the artist, and the picture needs no description when seen. It is worth more than the subscription price of the Journal, and we know it will be appreciated by all.

No. 4 is a beautiful Oil Chromo, in real oil colors, size 12 x 16, entitled

### VASE OF FLOWERS.

In this Chromo is shown a beautiful bouquet of all the rarest flowers known, so tastily and beautifully arranged that one almost thinks they are gazing upon a bouquet of natural flowers instead of a picture.

Nothing can be more lovely than these pure, sweet flowers. Everyone who sees this picture is always ready to declare that they never saw anything more beautiful, and are really surprised to learn that we can furnish them for less than \$2.00 per copy. The dark back-ground, green leaves, beautiful vase, together with its great variety of beautiful and bright colored flowers, make it the most elegant and taking flower piece ever put before the public.

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All may obtain this beautiful Chromo, together with the three others herein described, by simply paying \$1.00 for the "HOUSEHOLD JOURNAL" one year. We have given but a poor idea of these four beautiful Chromos, but as soon as seen they will be appreciated by everyone. Every Chromo is finely varnished with the very best picture varnish, and if they ever become soiled they can be cleaned the same as an Oil Painting, without affecting the colors in the least. We have spared no pains or expense to have them superior to any now before the public, and we believe we have accomplished it. Not one person in a hundred can resist the temptation to subscribe, and get these four Chromos and our mammoth paper for the small sum of \$1.00.

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Although we give each subscriber our large 24-page paper and four beautiful Chromos for \$1.00, still we allow Agents a commission of 40 cents for each subscriber. Agents collect from each one who subscribes \$1.00 for the paper one year, and the four premium Chromos; of this dollar the agent keeps 40 cents and sends us 60 cents. The 60 cents pays us for the paper one year and the four Chromos, and postage on both.

Remember, we prepay all postage, both on Chromos and paper. Our terms are the most liberal ever made, when you take into consideration the size of our paper and the beauty of our Chromos.

Some publishers pay but 25 or 30 cents to start with; but we offer you 40 cents right through, whether you send 5 or 5,000 subscribers.

We know that our offer of 40 cents on each subscriber you send us for our paper and premiums is better than 75 cents would be on most papers.

Our paper, with its 24 pages of choice reading matter and fine illustrations, is so great an inducement that most every one will subscribe without urging. The people want and will have just such a paper, and all you have to do is to show the paper and our four beautiful Chromos, and you are almost sure of a subscriber.

Again, our paper is not of the trashy kind, and our firm is known as one of the most honorable and respectable in the country, and you will find, if you have ever canvassed for a paper, that ours is the most taking you ever canvassed for. Therefore, let us again urge you to send for an outfit and try it.

**OUTFITS.**

We send to agents an outfit actually worth \$2.00, and all we ask for this is 40 cents as a guarantee that the Chromos will be used for canvassing purposes. We do not care to SELL the Chromos for 40 cents, and will cheerfully return the money paid for outfit, if in good condition. Any one sending for an outfit must write us a letter like the following:

*To James Lee & Co:*

You will find enclosed 40 cents to pay for your complete canvassing outfit for the Household Journal

- The outfit to contain the following:
- Oil Chromo, "Kiss Me," size 12x16.
- Oil Chromo, "We Are Coming," size 12x16.
- Oil Chromo, "The Vacant Chair," size 12x16.
- Oil Chromo, "Vase of Flowers," size 12x16.
- Sample copies "Household Journal."
- Blank Subscriptions Lists.
- Addressed Return Envelopes.
- Instructions for Canvassing.

In consideration of your sending me your complete outfit for 40 cents, I hereby assure you, upon my honor, that I will give the business a fair trial in my neighborhood, and if I find it pays me I will continue to act as your agent. I also agree to make returns promptly and report often. I shall expect your full profit by return mail, and will at once go to work for you.

Yours, &c,

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Some will say, we have no time to canvas. Reader, we care not who you may be, if you have but five minutes each day, you may secure at least one subscriber and make 40 cents. Surely that will pay for the time expended. But you are not obliged to neglect or leave your other business. To those who do not care to take an agency we make the following liberal offer of

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#### IN CONCLUSION.

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## FARMING LANDS FOR SALE.

THE HUDSON'S BAY CO. HAVE VERY LARGE  
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They own two sections in each Township, and have  
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## Splendid Prairie Farms, Graz- ing Land and Wood Lots.

Prices run from \$5 to \$8 per acre, according to  
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country and the lands for sale, can be had on ap-  
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## *Farms, Farms, Farms.*

The undersigned has several choice improved Farms  
and Wild Lands in all parts of western Ontario for sale  
very cheap, and on easy terms of payment. Intend-  
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will be sold for their claim.

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Our Illustrated and Descriptive Catalogue of AGRI-  
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the engine only consumed half a cord of soft wood  
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"Little Giant" is the best horizontal engine made.  
(Signed), J. YAES, Hatchley, Ont." The "Little  
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The great success which has attended the sale  
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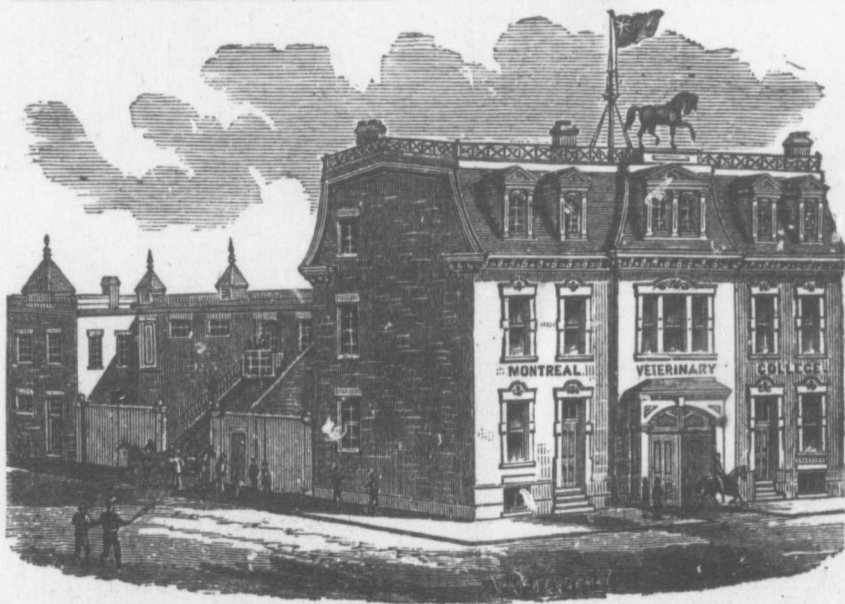
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the three great agents of modern times for curing disease without the aid of medicine. Their use has been attended with great success, more particularly in the following diseases:—Indigestion, Liver Complaint, Nervousness, Neuralgia, Sick Headache, Rheumatism, Fits, Female Weakness and Womb Diseases, Bilious Fevers and many other diseases arising from a sluggish state of the stomach and liver.

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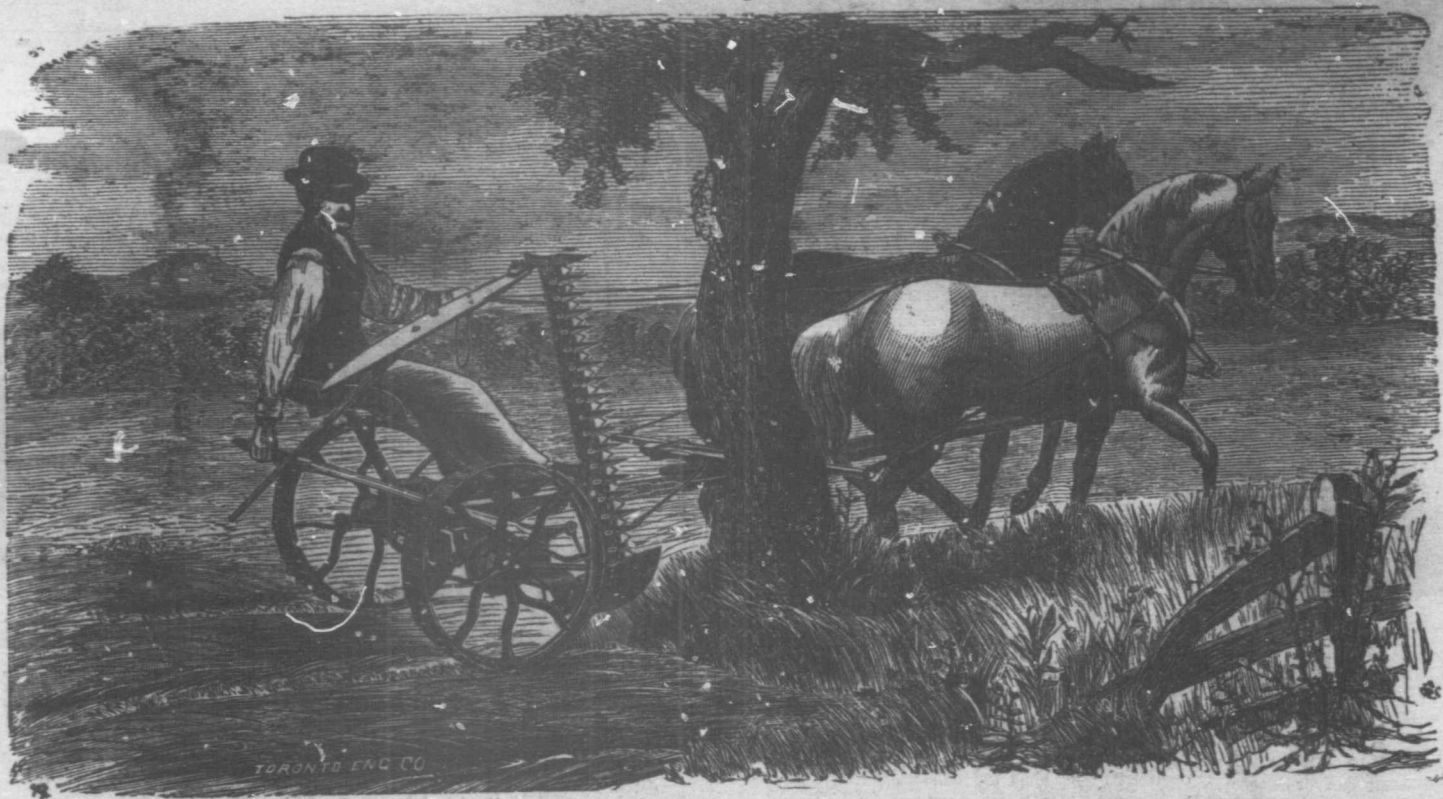


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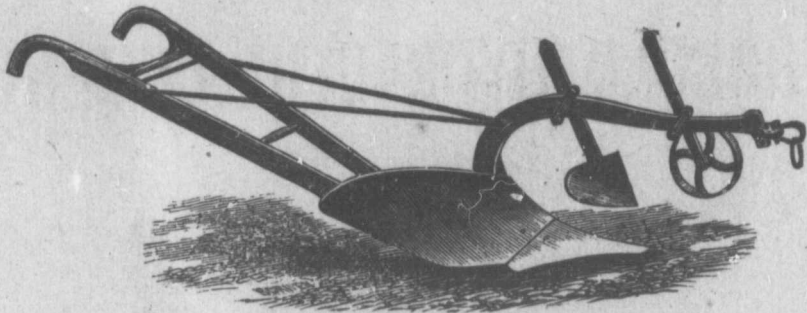
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**AS THE BEST FRONT CUT MOWER MADE.**

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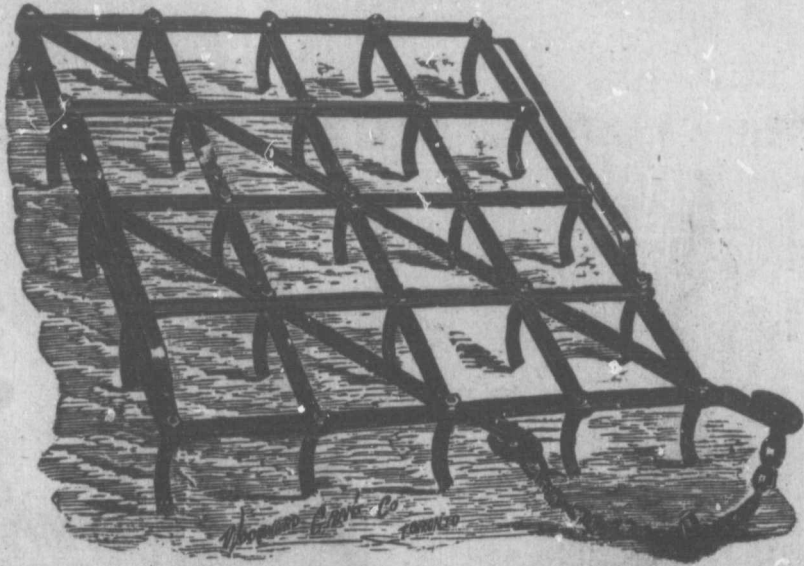


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## THE JOINTER PLOUGH

Is made with Soft Centre Steel Mould Boards, of the finest quality, and fitted with either Steel or Cast Points. The Skim is made of Steel with Wrought Iron Shank.

## IRON SCARIFIER.



Strong and Durable. The Teeth are all Steel Pointed.

The Iron Scarifier Cultivator Harrow is the most perfect implement of its class ever made. It pulverizes the soil more thoroughly than any other Cultivator. Breaks up easily the stiffest soil and does not clog. Very cheap for cash. Made by

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Manufacturers of the largest variety of Steel Ploughs in the Dominion; also Grain Crushers, Iron Cultivators, Straw Cutters, Horse Eoes, Garden Seed Drills, Brick Machines, Trucks, Road Scrapers, &c.

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## THOROLD HYDRAULIC CEMENT

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### White Land Plaster.

THE Thorold Hydraulic Cement is superior to any manufactured on the American Continent. It took the first Prize at the Paris Exposition in France, in 1855, and also at the World's Fair in London, England, in 1862, for which I hold medals. It has been used in the construction of

NEARLY ALL THE PRINCIPAL PUBLIC WORKS IN THE DOMINION !

Notably among them the VICTORIA BRIDGE, Montreal, the NIAGARA SUSPENSION BRIDGE, the old WELLAND CANAL, and it is now being used exclusively in the Welland Canal enlargement.

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### FORCE & LIFT PUMPS,

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With Hose Reel combined ; and Patent Pumps for SHIPS, BARGES, RAILWAYS FACTORIES, WELLS, CISTERNS, &c., &c., with self-ventilating base (anti-freezing), also various kinds of COMMON PUMPS.

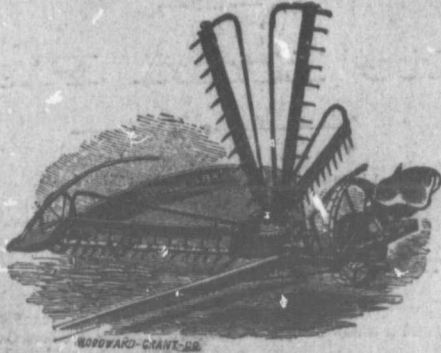
Awarded First and Extra Prizes at the Provincial Exhibitions in Ontario and Quebec, with Diploma.

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**THE GENUINE  
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1880.



1880.

**IT STANDS WITHOUT A RIVAL IN THE FIELD.**

**HURON.**

In 1877, the MAXWELL first entered the field at Huron, which is the oldest, best conducted, and by far the most important trial in Canada. The BRONZE MEDAL was obtained, defeating the Kirby, Royce, Johnston and others.

In 1878, the MAXWELL again competed at this Trial, carrying off the SILVER MEDAL, and defeating the Kirby, Canadian Harvester, Johnston and Continental.

In 1879 (the past season), the MAXWELL again competed at the above Trial. No. 1 "Maxwell" obtaining the GOLD MEDAL, and "Maxwell No. 2, the BRONZE; defeating the Bradley and Canadian Harvester, Johnston, Continental, Newcastle Harvester, and the Lyon or Royce. Several of the old leading, but now almost defunct, machines having withdrawn from the last contest.

**BEVERLEY.**

At the Beverley Agricultural Society's trial, near Rockton, in 1878, the MAXWELL carried off the SILVER MEDAL (the only prize), defeating the Harvest Queen, Bradley Harvester, Royce, (by Watson), Noxon's Standard, Newcastle Harvester and Canadian Harvester.

**CARADOC.**

During the past harvest the MAXWELL competed at the Caradoc Agricultural Society's Trial, near Mount Brydges, obtaining FIRST PRIZE and DIPLOMA, and defeating Harvest Queen, by "Gurney & Russell;" Harvest Queen by "J. Craig;" Newcastle Harvester and the Royce, by "Haggart."

**PORT HOPE.**

The Hamilton Agricultural Society Trial was held near Port Hope, July 27th, 1879. Competitors:—CHAMPION, NEWCASTLE HARVESTER, HARVEST QUEEN AND MAXWELL No. 1. After a comparison of the work done and construction of machines, the MAXWELL No. 1 was awarded the FIRST PRIZE.

I do not allow my Agents to compete at any petty trial, but am always prepared to enter a genuine Agricultural Society's Trial, leaving the MAXWELL to win or lose upon its merits. At every such Trial last harvest, the "Maxwell" won the FIRST PLACE.

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**DAVID MAXWELL,**

PATENTEE AND MANUFACTURER,  
PARIS, ONTARIO, CANADA.