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G. B. Strull

July 1911

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Barman

E S S A Y S

M E D I C A L

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E X P E R I M E N T A L.

V O L. II.

ESSAYS

MEDICAL AND EXPERIMENTAL,

ON THE

Following SUBJECTS;

- | | |
|--|---|
| 1. On the COLUMBO ROOT. | 5. On the antiseptic and sweeten-
ing powers, and on the varie-
ties of FACTITIOUS AIR. |
| 2. On the ORCHIS ROOT. | 6. On the Noxious Vapours of
CHARCOAL. |
| 3. On the WATERS of BUXTON
and MATLOCK in Derbyshire. | 7. On the ATRABILIS. |
| 4. On the Medicinal Uses of
FIXED AIR. | 8. On SEA SALT. |
| | 9. On COFFEE. |

TO WHICH ARE ADDED,

SELECT HISTORIES OF DISEASES,

WITH REMARKS; AND

PROPOSALS FOR ESTABLISHING MORE ACCURATE AND
COMPREHENSIVE BILLS OF MORTALITY.

BY

THOMAS PERCIVAL, M.D. F.R.S. & S.A.

——— *Sicut formica,*
Ore trahit quodcunque potest atque addit acer-vo.

HOR. Lib. 1. Sat. 1.

L O N D O N :

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THE
FOLLOWING
ESSAYS
ARE INSCRIBED
TO
THE RIGHT HONOURABLE
GEORGE
EARL OF STAMFORD,
&c. &c. &c.
AS A TRIBUTE
OF
ESTEEM, RESPECT, AND GRATITUDE,
BY
HIS LORDSHIP'S
MOST OBLIGED
AND MOST OBEDIENT SERVANT,
THOMAS PERCIVAL.

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T H E
P R E F A C E.

THE great Lord Verulam recommends the collecting of facts, observations, and experiments, as the best method of promoting the improvement of physic; and experience hath fully evinced the utility of such a plan. In this way I am ambitious of contributing my mite to the general stock of medical

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knowledge; and shall think myself happy, if I can thus render the pursuit of my own instruction and amusement, subservient to the interests of my profession, and to the general good of mankind.

THE Observations on the COLUMBO ROOT have been read at the College of Physicians, and before the Royal Society; and have been communicated to a considerable number of my friends and correspondents, to some of whom this remedy was unknown, and by others applied only to the cure of the *cholera morbus*. During the course of the

P R E F A C E. ix

the last year, I have had the satisfaction of receiving from them the strongest testimonies of its efficacy, in a variety of disorders. What I have advanced, therefore, in its favour, may be regarded, not as the conclusions of an individual, partial to a favourite remedy, but as facts supported by the experience of many learned and ingenious Physicians.

THE dissertation on the ORCHIS ROOT has been honoured, by Doctor Hunter of York, with a place in the Georgical Essays, a useful and entertaining work on the subject of agriculture. But as it contains some experiments and observations on the medicinal qualities

x P R E F A C E.

ties, as well as on the culture and preparation of this root, it is here reprinted, with a few corrections and additions.

THE papers on FACTITIOUS AIR form a part of an experimental inquiry into this interesting and curious branch of physics; in which the friendship, and too favourable opinion of Dr. Priestley first engaged me, in concert with himself. But this learned philosopher, who possesses a happier genius, more leisure, and better health than I am blest with, has carried his researches far beyond the limits of mine; and his pleasing and wonderful discoveries in these almost trackless paths of science, will reflect

P R E F A C E. xi

reflect the highest honour on his industry and abilities.

To this second volume of Experimental Essays, I have annexed a few select HISTORIES OF DISEASES, agreeable to the plan of Lord Bacon, who advises Physicians "to revive the Hippocratic method of composing narratives of particular cases, in which the nature of the disease, the manner of treating it, and the consequences are to be specified; to attempt the cure of those diseases, which have been too boldly pronounced incurable; and to extend their inquiries into the powers of particular medicines, in the cure of particular disorders." (a)

THE

(a) De Augment. scient. l. iv. cap. 2.

xii P R E F A C E.

THE PROPOSALS for establishing more accurate and comprehensive BILLS of MORTALITY, were suggested by the perusal of a Treatise on Reverſionary Payments, lately published by my friend Dr. Price; who employs his great mathematical knowledge, not in idle speculation, or in the ſolution of amuſing problems, but in diſquiſitions at once curious, inſtructive, and of the higheſt importance to the intereſts of mankind. The Plan has been honoured with his approbation, and is likely to be carried into immediate execution at Manchester.

I CANNOT take my leave of the candid reader without intimat-
ing

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ing, that though the experiments contained in theſe ſheets were made with great care, and are related with the ſtricteſt fidelity, I am ſenſible many inaccuracies may have eſcaped me; which thoſe will moſt readily excuſe, who have experienced the difficulties incident to ſuch reſearches. The Philoſopher has frequent occaſion to lament both the fallacy of his ſenſes, and the limited powers of his underſtanding. “ You will wonder, ſays Mr. Boyle, in the preface to his philoſophical Eſſays, that I ſhould uſe ſo often *perhaps*, *it ſeems*, *’tis not improbable*, words which argue a diffidence of the truth of the opinions I incline to. But I have hitherto not unfrequently

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quently found that what pleased me for a while, was soon after disgraced by some further, or new experiment." Such is the imperfection of human knowledge, even when derived from evidence, which is usually regarded as the most clear, and incontestible. And so true is the sentiment of the comic poet,

*Nunquam quisquam ita bene subducta ratione
ad vitam fuit,
Quin res, ætas, usus aliquid apportet novi,
Aliquid admoneat, ut illa quæ te scire credas,
nescias,
Et quæ tibi putaris prima in experiundo
repudies.*

TERENT.

MANCHESTER,
1st Jan. 1773.

THE

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EXPE-

EXPERIMENTS
AND
OBSERVATIONS
ON THE
COLUMBO-ROOT.

B

— *Symbolum aliquid, utcunque exiguum,
in commune medicinae ærarium contribu-
erem.*

SYDENHAM.

OBSERVATIONS AND EXPERIMENTS

ON THE

COLUMBO-ROOT.

THE Columbo-root, though a medicine of considerable efficacy, is not so generally known in practice as it deserves to be. Books, so far as my reading extends, are silent about it; and I have not hitherto been able to obtain any satisfactory information concerning its Natural History. The celebrated Linnæus is unacquainted with it. Dr. Watson made particular enquiry concerning it of an East-India Governor, and also of Mr. Loten, who was several years Governor of Ceylon. These Gentlemen

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inform-

informed him only that the root was brought to Ceylon, and to our settlements, where it is called in the Portuguese language *Raijs de Mofambique*. Doctor Hope, Professor of Botany at Edinburgh, has transmitted to me the following account, which he received from Dr. Rainey, a Physician who resided a long time in the East-Indies. The Columbo-root grew originally on the continent of Asia, and was from thence transplanted to Columbo, a town in Ceylon, which now gives name to it, and supplies all India with it. The inhabitants of these countries have for a long time used it in disorders of the stomach and bowels. They carry it about with them, and take it sliced or scraped, in Madeira wine.

THE Columbo-root comes to us in circular pieces, which are from half an inch to three inches in diameter; and divided into *frusta*, which measure in length from two inches to one quarter of an inch.

inch. The sides are covered with a thick, corrugated bark, of a dark brown hue on its external coat, but internally of a light yellow colour. The surfaces of the transverse sections appear very unequal, highest at the edges, and forming a concavity towards the centre. On separating this surface, the root is evidently seen to consist of three *lamina*, viz. the cortical, which in the larger roots is a quarter of an inch thick; the ligneous, about half an inch; and the medullary which forms the center, and is near an inch in diameter. This last is much softer than the other parts, and when chewed seems very mucilaginous: A number of small fibres run longitudinally through it, and appear on the surface. The cortical and ligneous parts are divided by a circular black line. All the thicker pieces have small holes drilled through them, for the convenience of drying.

THIS root has an aromatic smell, but
B 3 is

is disagreeably bitter and slightly pungent to the taste, somewhat resembling mustard-seed, when it has lost by long keeping part of its essential oil. Yet though ungrateful to the taste, when received into the stomach it appears to be corroborant, antiseptic, sedative, and powerfully antiemetic.

IN the CHOLERA MORBUS it alleviates the violent *tormina*, checks the purging and vomiting, corrects the putrid tendency of the bile, quiets the inordinate motions of the bowels, and speedily recruits the exhausted strength of the patient. Mr. Johnson of Chester, a surgeon of eminence, who served ten years on board one of his Majesty's ships in the East Indies, and in 1756 had the care of an hospital-ship, gave the Columbo-root in that climate to a great number of patients, often twenty in a day, attacked with this disease. He seldom employed any means to promote the discharge of bile, or to cleanse

cleanse the stomach and bowels, previous to its exhibition: And he generally found that it soon stopped the vomiting, which was the most fatal symptom, and that the purging and remaining complaints, quickly yielded to the same remedy. The mortality on board his ship, after he used this medicine, was remarkably less than in the other ships of the same fleet; and this difference he attributes entirely to the good effects of the Columbo-root in this fatal disorder. The dose he gave was from half a drachm to two drachms of the powder, every three or four hours, more or less according to the urgency of the symptoms.

THOUGH Columbo-root does not seem to possess much, if any degree of astringency, yet I have often observed very salutary effects from its use, in DIARRHOEAS, and even in the DYSENTERY. In the first stage of these disorders, when astringents would be hurtful, this root

may be prescribed with safety and advantage, for by its antispasmodic powers, it corrects the irregular action of the *primæ viæ*. But as a cordial, tonic, and antiseptic remedy, it answers better when given towards their decline.

I HAVE more than once experienced its efficacy in the vomitings which attend the BILIOUS CHOLIC; and in such cases where an emetic is thought necessary, after administering a small dose of ipecacuan, the stomach may be washed with an infusion of Columbo-root. This will answer the purposes of an evacuant, as well as chamomile tea, and will tend to prevent those violent and convulsive reachings which in irritable habits, abounding with bile, are sometimes excited by the mildest emetic. The efficacy of ipecacuan in the cholic, given in small doses, is well known; and perhaps its operation as an antispasmodic may in some measure depend on the nausea which it produces.

But

But unfortunately it often occasions very severe sickness and vomiting, and thus aggravates the disorder, by inducing a new and most distressing symptom. Perhaps (for I speak not from experience) if it were combined with some grateful aromatic, and administered in an infusion of Columbo, prepared with mint water, this troublesome effect might be obviated.

IN BILIOUS FEVERS, fifteen or twenty grains of this root, with an equal or double quantity of vitriolated tartar, given every four, five, or six hours, produce very beneficial effects. The neutral salt abates the febrile heat, allays thirst, and brings on a gentle salutary *diarrhœa*; whilst the Columbo-root supports the strength of the patient, obviates the nausea and sickness to which he is so much disposed, and powerfully checks the septic ferment in the *primæ viæ*. When the belly is sufficiently soluble, an infusion of it may be directed, well acidu-
lated

lated with *elixir vitriol. dulc.** Is it not probable, that the Columbo may be highly serviceable in the malignant, YELLOW FEVER of the West-Indies? This fever is always attended with great sickness, violent reachings, and a copious discharge of bile. The vomiting recurs at

* DR. HAYGARTH, a very ingenious Physician at Chester, has lately by my recommendation, made trial of the Columbo-root, in a fever of the bilious kind, which has been epidemic at Namptwich, and in other parts of Cheshire; and he has favoured me with the following account of his success. "After the *primæ viæ* have been sufficiently unloaded of their bilious, and other putrescent contents, I find the Columbo-root a most useful remedy, in allaying the nausea and reachings, to which the patients are liable. In this fever, though the remissions are very evident, and the accessions generally marked with chills and other symptoms of an intermittent, yet the bark appears to do more harm than good, as it occasions an increase of feverish heat, and a parched tongue. The Columbo in these cases seems to supply its place most admirably, by correcting the bile, restoring the proper tone of the stomach, and of the whole habit. It also prevents relapses, to which in this fever, the patients are particularly disposed."

"SUCH

at short intervals, often becomes almost incessant, and an incredible quantity of bile is sometimes evacuated, in a few hours.

CHILDREN during DENTITION, are frequently subject to severe vomitings and diarrhœas. In these cases the Columbo-root is an useful remedy; and I have seen almost instant relief procured by it, when other efficacious medicines had been tried in vain. The more effectually to correct the acidities which at such times usually prevail, a little chalk or magnesia may be combined with it.

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"SUCH have been the good effects of the Columbo-root in the cases which have fallen under my own observation; but a judicious Apothecary informs me, that he has often seen it fail of success in this fever, which in no respect seems wonderful. It is not supposed that Columbo has any febrifuge quality, similar to antimony, or Peruvian bark. By correcting the putrid bile it destroys the *foetus* which aggravates the fever, and produces many of its most dangerous symptoms. When bilious fevers are epidemical, does it not seem a probable remedy to prevent the disease?"

THE Columbo-root is extremely beneficial in a LANGUID STATE of the STOMACH, attended with want of appetite, indigestion, nausea, and flatulence. It may be given either in substance, with some grateful aromatic, or infused in Madeira wine, and during the use of it, gentle doses of the tincture of rhubarb, or of any other strengthening and cordial purgative, should occasionally be prescribed. If the bile appear to be defective, a sufficient quantity of ox gall, carefully evaporated to the consistence of an extract, may be mixed with the powder of Columbo, and the mass reduced into pills. In this manner I have frequently taken the Columbo-root myself, and have generally found my appetite increased, and my digestion improved by it.

HABITUAL VOMITING, when it proceeds from a weakness or irritability of the stomach, from an irregular gout, from acidities,

acidities, from acrimonious bile, or an increased and depraved secretion of the pancreatic juice, are greatly relieved by the use of Columbo-root, in conjunction with aromatics, chalybeates, or the testaceous powders. But this disease often arises, when such a cause is least suspected, from an affection of the kidneys. Under such circumstances, demulcents, and gentle diuretics, are the most successful remedies; though I have frequently observed temporary relief procured by a light infusion of this root in mint water.

SUCH an infusion succeeds better than any other medicine I have tried, in the nausea and vomiting occasioned by PREGNANCY. But it is sometimes necessary to premise venæsection, and always expedient to keep the patient's body moderately open with magnesia.

I COULD

I COULD illustrate the truth of these observations, by a variety of cases; but to enter into so minute a detail would be equally unnecessary and uninteresting. I shall confine myself therefore to the relation of a few histories, which exemplify the peculiar, or if the expression be allowable, specific qualities of the Columbo-root.

C A S E I.

T. H. of Newton-lane near Manchester, in the month of August 1770, from exposure to cold when overheated with hard labour, was attacked with a severe purging and vomiting, accompanied with violent pain in his stomach and bowels. He continued in this miserable condition twenty-four hours before I saw him, and his strength was then nearly exhausted. I directed two scruples of the powder of Columbo-

Columbo-root, to be given every three or four hours in pepper-mint water. This remedy afforded almost immediate relief; but the patient returning too soon to his occupation, had a relapse, and was again restored to health by the same medicine.

* C A S E II.

W. W. August 31. 1770, had been seized with a looseness three days before, which had gradually increased, and for the last four hours, been most violent, attended with frequent vomiting, and cramps in his extremities. He was directed to take a scruple of the powder of Columbo every two hours, and had neither vomiting, nor purging after the first dose. Nine doses restored him to perfect health.

* Communicated by Dr Haygarth.

CASE

* C A S E III.

APRIL, 1771. Mrs. P—— about the beginning of the third week of her confinement in child-bed, began to complain of great pain, fullness, and uneasiness in the bowels, accompanied with frequent and copious evacuations by stool. What was discharged had the colour and consistence of cream. The pulse was from 100 to 115. The tongue had a whitish fur; and the skin was often dry and hot. The evacuations by stool, and the other symptoms were always much more considerable during the night, than in the day. Ipecacuanha as an emetic, opiates, elixir of vitriol, and other cooling restraints, afforded no relief. A strong infusion of the Columbo-root in cinnamon tea, was then given with the desired effect. After every tea-cup full of the infusion

* Communicated by Dr. Dobson of Liverpool.

fusion the patient found herself better; the painful sensations were relieved, and the evacuations diminished. In about five days she was entirely cured.

C A S E IV.

R. N. Esq. aged 26, the latter end of June 1771, when the weather was extremely hot, was seized with the usual symptoms of a fever. An emetic and gentle cathartic were administered, and saline draughts were directed to be taken at proper intervals. He persisted in this course two or three days, without any sensible relief. A continual nausea, and frequent vomitings of green bile now came on. The skin was hot and dry; the pulse beat an hundred and twenty strokes in a minute; the tongue was foul; the belly not sufficiently soluble, notwithstanding the free use of strawberries, and other fruit was enjoined; and he complained

C

plained of great pain in his head and back, attended with universal lassitude. A clyster was immediately injected; and two scruples of vitriolated tartar were given every four hours, in three spoonful of the infusion of Columbo. The first dose almost instantly alleviated the nausea and sickness, and the continuance of the same remedy entirely prevented their return; whilst the gentle diarrhœa produced by the neutral salt, mitigated all the febrile symptoms. On the eleventh day he had two bloody stools, and as his constitution was feeble and relaxed, the Peruvian bark combined with astringents was administered without delay: The hæmorrhage was soon checked, and the patient gradually recovered his usual health and strength.

C A S E V.

JUNE 2d, 1771. Mr. W.'s son, aged 2, with other symptoms of dentition, had
severe

severe purging and vomiting, which continuing three days, reduced him to the lowest degree of weakness. I directed five grains of Columbo-root, and three grains of *pulv. e chel. c. c.* to be taken every two hours. The vomiting was stopped by the first dose; the looseness was soon after checked, and in two days the child recovered his usual strength.

I SHALL now proceed to relate the experiments which I have made on the Columbo-root.

EXPERIMENT I.

Two drachms of Columbo-root powdered, were infused without heat, in four ounces of each of the following *menstrua*.

1. Rectified spirit of wine.
2. French brandy.
3. Madeira wine.
4. White wine.
5. Distilled water.
6. White wine vinegar.
7. Hard spring water.

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ty-four hours digestion, the tinctures, &c. were filtered through paper, and equal quantities of each, and of their respective *menstrua* were weighed with great exactness, and compared together. The tincture made with rectified spirit of wine, appeared by its taste, colour, and superior specific gravity to the simple spirit, to be considerably stronger than the rest; whose degree of impregnation, seemed by these tests, to be exactly in the order in which I have enumerated the several *menstrua* employed in their preparation. It should be remarked, that the watery infusion of Columbo-root is more perishable than that of other bitters. In twenty-four hours a copious precipitation takes place in it, and in two days it becomes ropy and even musty.

EXPERIMENT II.

THE addition of orange peel renders the infusion of Columbo-root less ungrateful

grateful to the palate. An ounce of the powdered root, half an ounce of orange-peel, two ounces of French brandy, and fourteen ounces of water, macerated twelve hours without heat, and then filtered through paper, afforded a sufficiently strong, and tolerably pleasant infusion.

EXPERIMENT III.

TWELVE ounces of Columbo-root in gross powder were digested four days in three pints of rectified spirit of wine. The tincture was then filtered; and the *residuum* boiled repeatedly in a sufficient quantity of water, till it yielded no taste to the liquor. The decoctions, having been carefully percolated, were evaporated over a gentle fire in the common method, till about three quarts only remained. The evaporation was then continued in the vapour bath, and when nearly finished, the tincture, from which a part of the

spirit had been previously drawn by the alembic, was gradually added, and the whole reduced to a pilular consistence, retaining the entire flavour of the Columbo, free from the least degree of *emphyreuma*, and weighing eight ounces and two drachms. The spirit distilled from the tincture was neither impregnated with the taste nor odour of the root; which is a proof that no volatile parts were dissipated by this process. This experiment was made at my request, by Mr. Henry, an ingenious and accurate Apothecary in Manchester. I have frequently used the extract of Columbo, and find it equal, if not superior in efficacy to the powder.

EXPERIMENT IV.

EQUAL weights, viz. about two drachms of beef, cut into small pieces, were macerated separately in an ounce of a cold infusion of the Peruvian bark, and of Columbo-

lumbo-root, filtered and prepared in a manner exactly similar. The experiment was made in the month of July, the weather was uncommonly warm, and the bottles were placed in a window which had a southern aspect. In forty-eight hours the beef in the infusion of Columbo-root had acquired a slightly putrid foetor, whilst that in the infusion of bark remained perfectly sweet, and continued so ten hours longer. Two drachms of beef macerated in cold water, and intended for a standard, became putrid in twenty-four hours, under the circumstances above described.

EXPERIMENT V.

THE putrid beef employed as a standard in the last experiment, was divided into two equal parts, to one of which was added an ounce of the infusion of Columbo-root; to the other the same quantity

tity of the infusion of Peruvian bark. After six hours maceration, the pieces of flesh had lost much of their putrid fœtor; but that in the infusion of Columbo-root, was more offensive than the other.

EXPERIMENT VI.

To several phials, each containing three drachms of putrid ox gall, and two drachms of saliva, were added equal quantities, viz. an ounce of, 1. the infusion of Columbo-root; 2. the infusion of Peruvian bark; 3. the infusion of chamomile flowers; 4. spring water: the last was intended as a standard. The phials were placed in a water bath, heated to about 100 degrees of Fahrenheit's thermometer. When the infusion of bark was mixed with the putrid gall and saliva, it instantly produced a coagulation of the gall, and considerably increased the fœtor of it. Whereas the infusion of Columbo united perfectly with it,

it, and very powerfully corrected its offensive smell. The infusion of chamomile occasioned no change in the bile, either with respect to its fœtor or fluidity. After three hours digestion, the putrid smell of the gall was much abated, in all the phials but the standard, and even in that was less perceptible than at first. In six hours no fœtor could be perceived, except in the standard; and the mixture with the bark had acquired a vinous smell, and emitted many air bubbles. In twelve hours the odour of the gall was sensible, but not offensive in the mixtures with Columbo and chamomile: The bark now fermented less, and had lost somewhat of its vinous smell. In twenty-four hours the standard became extremely putrid; the mixture with bark was sour; the Columbo and chamomile were still sweet; but in thirty hours they became putrid, and in forty hours they were highly offensive.

THE

THE instantaneous effect of the infusion of Columbo in correcting the putridity of the ox gall, serves in some measure to explain its action in the *cholera morbus*, and other diseases, attended with a redundancy and depravation of the bile: And at the same time it obviates all objection to the use of this remedy, previous to any artificial evacuations, in the first stage of such disorders; a practice which indeed is justified by its success. The coagulation and increased foetor of the gall, which the infusion of bark occasioned, very well account for the disagreement of that medicine with the stomach in the yellow fever of the West-Indies. Doctor Hillary laments that though strongly indicated, it cannot be retained, even under the pleasantest form. Is it not probable that the Columbo-root, which so readily unites with, and so quickly sweetens putrid bile, would prove very salutary in this dangerous and malignant disease?

EXPE-

EXPERIMENT VII.

EQUAL quantities, viz. an ounce of water, of the infusions of Columbo-root, Peruvian bark, and chamomile flowers, were added to four phials, each containing three drachms of fresh ox gall, and two drachms of saliva. The bottles were then placed at such a distance from the fire, as to be kept blood-warm. In six hours all the mixtures except the standard, were in fermentation. The infusion of bark emitted most, and that of Columbo the fewest air bubbles: The former also had acquired a vinous smell. In twenty-four hours the standard became putrid. In forty-eight hours the infusion of bark was sour, that of chamomile slightly putrid; but that of Columbo-root was perfectly sweet, and continued so many hours afterwards, when the phials were set aside.

N. B. THE infusion of bark when mixed

mixed with the recent gall produced a coagulation, but not in so great a degree as when combined with putrid bile.

SIR JOHN PRINGLE found that chamomile flowers resist the purefaction of animal flesh, more powerfully than Jesuit's bark; and from one of the preceding experiments it appears that in this respect, bark is more antiseptic than Columbo-root. But as a preservative of the *bile* from putridity, this root surpasses *chamomile flowers*, without producing like the bark any changes in it by fermentation. Hence may be justly inferred the utility of Columbo-root in disorders of a putrid tendency, and in an impaired digestion from corrupted bile, or vitiated and un-found saliva.

EXPERIMENT VIII.

To determine the comparative action of Columbo-root, on the fermentation of

of food in the stomach; I digested in the water bath three alimentary mixtures, prepared of two drachms of the crumb of bread, the same quantity of roasted mutton chopped very small, and an ounce of the infusions of Columbo-root, chamomile flowers, and mustard seed. The ingredients of each mixture were well united by triture in a mortar; and a fourth phial was provided as a standard, which contained the proportions before-mentioned of bread and mutton, with half an ounce of water, and the same quantity of saliva. In twelve hours the standard began to ferment; in thirty hours an intestine motion was perceptible in the other mixtures, but appeared to be least in the phial which contained the Columbo-root. In forty-eight hours the standard became sour. The third day the mixture with the infusion of chamomile was also sour. The two remaining phials, viz. the infusions of Columbo and of mustard, were now placed by the fire, where

where they continued ten days, without shewing the least signs either of acidity, or of putrefaction.

THE resemblance between the taste of mustard and of Columbo-root, induced me to try their comparative action on alimentary fermentation. And it appears that they concur in moderating, without suspending the process of digestion. This property gives Columbo-root the advantage over other bitters, in such disorders of the stomach, as are attended with a violent fermentation of the food, with flatulence, and great acidity. And if a stimulus be wanting to excite this organ to a quicker expulsion of its contents, some grateful aromatic may be combined with it: Or perhaps mustard-seed would equally answer this intention, without increasing, like the spices, the generation of air. This experiment proves the remarkable efficacy of the Columbo in preventing acidities; and the succeeding one no less clearly

clearly evinces its power of neutralizing them.

EXPERIMENT IX.

To an ounce of the infusions of chamomile flowers, of Columbo-root, and of Peruvian bark, were added twenty drops of vinegar. The infusion of Columbo entirely neutralized the acid, that of chamomile flowers in some measure covered the taste of it; but the infusion of bark was evidently sour both to the taste and smell, and it required twenty drops more of vinegar, to render the infusion of Columbo equally acidulated with that of the bark.

EXPERIMENT X.

To ascertain the action of Columbo-root on the heart and arteries, I took a scruple

scruple of the powder in a small glass of spring water, at seven o'clock in the evening. My stomach was empty; I had been sitting at rest an hour; and my pulse then beat seventy-four strokes in a minute. I continued to sit still half an hour longer, and every fifth minute examined my pulse, but could perceive no variation, either in its regularity, fullness, or velocity. The succeeding evening I repeated the same experiment, with the precautions I had before observed, and increased the dose of Columbo to half a drachm. At the time I swallowed the powder, my pulse beat eighty strokes in a minute; in ten minutes it became fuller, and slower by three strokes, and continued to beat the same number, viz. seventy-seven for three quarters of an hour.

THIS experiment shews that the Columbo-root does not belong to the class of heating bitters: It may therefore be used with propriety and advantage in the
ptbisis

ptbisis pulmonalis, and in hectic cases, to correct acrimony, and strengthen the organs of digestion. The Peruvian bark often proves oppressive to the stomach in such disorders, and sometimes excites a *diarrhœa*. But the Columbo-root occasions no disturbance, and agrees very well with a milk diet, as it abates flatulence, and is indisposed to acidity.