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OF UNIVERSAL SCIENCE AND KNOWLEDGE:—HISTORICAL, NATURAL, AND MEDICAL ARTS AND SCIENCES:—INDUSTRY, AGRICULTURE, EDUCATION AND EVERY KIND OF USEFUL INFORMATION:

WITH NUMEROUS FIGURES.

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Knowledge is the mental food of man.

1. ARTICLE.

CHEAP BOOKS.

BOOKS are the vehicles of knowledge. The cheaper books are, the more accessible and diffusible becomes the knowledge which they convey.

Before printing was invented, manuscripts were few and costly, knowledge scanty and limited. Since printed books have become common, knowledge has increased 100 fold, libraries have multiplied, and mankind have acquired new means of enjoyment, of happiness, and mental attainments.

But books which had been rather cheap 100 years ago, had within 50 years become again very dear, owing to a fanciful luxury in paper, embellishments, and splendid bindings. This was one of the means, partly contrived by the oligarchy of knowledge, to exclude the people or bulk of mankind from the acquirement of knowledge.

Happily however since the beginning of this century, by the enlightened enterprize of some friends of mankind and the invention of stereotype printing, both arisen in France, a new era has begun in printing and producing again very cheap books; without precluding embellishments: which the restoration of wood engraving and the invention of lithography, have enabled to add at a cheap rate.

This new system, which promises such happy results for the gradual and universal spreading of knowledge, has lately been adopted also in Germany, England and America. But unfortunately chiefly applied (as at the discovery of printing) to restore or reprint old books, rather than producing new works. But some useful compilations, libraries of knowledge, manuals, &c. have been produced accessible to all the classes of the people.

It is a positive fact that in general mental acquirements and public happiness, are now every where in proportion to the average price of books, and the facility, or cheapness of this manufacture of knowledge! of this fact the following table may be a proof.

Average price of books in retail.	Vol. 8vo. of 400 pages.	Vol. 18mo. of 200 p.
Before printing was invented, towards 1400,	$100.00	$25.00
Towards 1700,	1.00	0.25
Towards 1800, in England,	5.00	1.00
in France,	1.50	0.50
In 1830.		
In England,	3.00	0.75
In the U. States,	2.00	0.50
In Germany,	1.25	0.25
In France,	1.00	0.20

Therefore in France where books are the cheapest, the people are the most enlightened, and they stand at the head of the actual civilization of polished nations.

But why could not the same prices and results be attainable with us? A great fall in the price of printing and paper has happened within

teeth in both jaws; but the eyes are nearly alike and both have the nictitant membrane very properly compared to that of the owls by Green.

12. Description of two new genera of Soft Shell Turtles of North America.—By C. S. Rafinesque.

APALONE and MESODECA.

The following account was prepared for the Philosopical Society of N. York in October 1816; but not published at the time. It is now given as written 16 years ago.

The Zoologists had preserved the Genus *Testudo* of Linneus, till Dumeril in 1806 established the G. *Chelonias* for the Sea turtles with feet like fins, the G. *Chelys* for the T. *matamata*, and the G. *Emys* for all the turtles with 5 moveable palmated toes. Lately the G. *Trionyx* has been proposed by Geoffory for the soft shell turtles with 3 toes and claws. But last year I proposed in my analysis of Nature (Palermo 1815) to divide the Turtles into 15. G. as they offer so many other important Characters.

They were 1 *Chelonias* D. 2 *Testudo* D.

3. *Gopherus*, Raf. With flat round nails. Type. T. *polyphemus* of North America.

4. *Chelonura*, Raf. with long tails 5 & 4 claws. the bills serrated. Type T. *indica*, many Sp. here blended.

5. *Chelyra*, Raf. Soft shell Sea turtles with sulcated back. Type T. *coriacea*.

6. *Trionyx* of G.

7. *Cheliphus*, Raf. Water turtles with Valved shells 5 claws and toes to all the feet.

8. *Uronyx*, Raf. an anterior valve to the shell, toes and claws 5 and 4, tail with a claw. T. Scorpioides, &c.

9. *Didicla*. Raf. Bivalve lower shell, toes 5 and 4. Type T. *clausa*, *odorata*, &c.

10. *Monoclida*, Raf. Lower shell valvular anteriorly, toes 5 & 4. T. *retziana* &c.

11. *Emyda*, Raf. or *Emys* D.

12. *Chelyda*, Raf. or Chelys D.

13. *Chemelys*, Raf. Warty Scales, no valves 4 toes to all the feet. T. verrucosa &c.

14. *Cheloras* Raf. No valve, toes not palmated 4 and 5. T. *Punctata* &c.

15. *Cheliurus*, Raf. No valves, feet palmated a long scaly tail. T. Serpentina &c.

This year I have discovered in my journey to the f[illegible] of the Hudson and to Lake Champla[illegible] new Soft Shell turtle which has 5 toes instead of three as *Trionyx*, and which I propose to call *Apalone*. Bartram has long ago described and figured another Soft shell turtle with 5 claws, which has been commonly blended with the T. *ferox*, this must form also another Genus *Mesodeca* by having 10 Scales in the middle of the back.

1 N. G. *Apalone* Raf.

The name is contracted from *Apalochelone* meaning Soft turtle.

Char. G. Body and limbs soft without scales. Nose proboscidal, jaws without a bill. Upper Shell smooth soft with a small keel anteriorly. Lower Shell anterior, body denudated behind. Five palmated toes to all the feet, with small claws. Tail short corrugated.

Apalone Hudsonica, Raf. Upper shell rounded elliptical, flat, entire, yellowish with brown spots, and a circular black line near the margin. Two oblong occulated spots before and behind the eyes. tail obtuse mucronate shorter than the shell.

A very pretty small species from 2 to 6 inches long, found in the River Hudson between the falls of Hadley, Glen and Baker, and further up to the source. It is called mud turtle and not eaten. It is a lively pretty animal, quite harmless, as it cannot bite, having no horny hard jaws. It dwells in the mud and sand, and buries itself under it in winter. It feeds on small shells and fishes.

Body olivaceous striped and dotted with brown; but entirely smooth without warts. Neck retractible and elongated when extended, grayish clouded with rufous as well as the feet. Head small with 2 singular large spots one before and one behind each eye, oblong yellow with a black margin, appearing like as many eyes; while the true eyes between them are small round with a yellow iris. Nose tubular like a proboscis extending beyond the mouth, and truncated with 2 round nostrils. Mouth large, with thin soft lips. The hind part of the body is denudated beneath, the lower shell extending only half way from before and is blueish white. Vent round, tail conical short thick rugose obtuse mucronate. Feet spotted, toes black, 5 unequal with small claws. The upper shell is very entire and prettily spotted, the margin is yellowish unspotted, then comes a circular black line blackish but spotted of brown, while the centre is olivaceous yellow with many round spots occulated and clouded by having a brown margin, with grey dots within. The small half keel extends only to the middle or as far as the lower shell below.

II. N. G. Mesodeca Raf.

The name means *middle* with *ten* Scales.

G. Ch. Body and limbs soft upper shell soft but with 10 hard scales in the middle, and 10 pair of hard lateral ribs,

with many horny warts before and behind. Lower shell hard and horny in the middle. Head with lateral compartiments above and lateral contractible warts. Nose proboscidal. Mouth with horny jaws. Five palmated toes to all the feet with crooked claws.

Mesodeca bartrami, Raf. Upper shell elliptical entire brown unspotted. Head long, neck rugose, warty.

Synonyms. Great Soft shell Tortoise Bartram's travels in Florida (Philadelphia 1791) page 177 to 179 fig. 4 and 5.

Testudo ferox of many authors but several species have been blended by them, found in Carolina, Alabama, and Louisiana, while Bartram says he found this only in East Florida. The T. *ferox* had been described and figured by many authors; but their figures and descriptions must be compared and revised. When not copied from Bartram they apply to other species or the true T. *ferox* of L. first figured in Philol. Trans. vol. 6. fig. 10. See also Lacepede, vol. I. tab. 5. and Schoepf. turtles, tab. 19.

This turtle of Bartram cannot more be the T. *ferox* which is a true *Trionyx*, than the *Apalone*! For the complete description and history of this species see Bartram's page and fig. quoted. It is one of the most explicit descriptions of his book, and the 2 figures of the body and head are no doubt correct. It is a large sp. 2½ feet long and weighing from 30 to 40 lb. excellent to eat. Although carnivorous it is no more ferocious than all the other turtles and terrapins feeding on prey.

New-York, October, 1816.

13. Geology and Oryctology.

Extracts of a Series of Geological Letters to Prof. Al. Brongniart, *President of the Geological Society of Paris; by Prof.* C. S. Rafinesque.

First Letter, March 1832.

There are now 4 schools or Systems of Geology in the U. States. 1. The old school to which Maclure, Mitchell, James, Troost, Nuttal, Schoolcraft, &c. belong. This is properly an American branch of the Wernerian school. They neglect fossil remains and merely depend upon the position of rocks.

2. The Northern school of which Prof. Eaton and Sillimar are the founders: it has many followers in the Northern States. It is based upon the series of formations from Boston to Lake Erie. It neglects fossils also, and lacks the solid foundation of Oryctology. It surmises that all the rocks of the U. States must agree with those of the North, without being able to prove it, since Eaton who has laid out the series of rocks, has never seen those of the South and West. He leans to the Plutonic theory.

3d. The English school believes that the whole world is to be found in England, and that our strata and formations must agree of course with those of England. Prof. Featherstonaugh, who has given lectures on this System of Geology, and now publishes a Journal of Geology is very sanguine and active on that opinion. He has many followers, who all incline to the Huttonian theory. They know that Oryctology is as needful to Geology, as Chronology is to History; but have hardly began yet to examine our fossils in sites.

4th. The fourth school is my own, I call it the *Natural and Oryctological Method of American Geology.* I began to teach it in my public lectures in Lexington in 1819 and 1820. Mr. Clifford and others had adopted it. I have not published much upon it yet; I was apprehensive of hurting the ideas of the systematic writers. But after 30 years of observations and reflections I think that I can boldly venture to compete with them for what I have seen and studied, while they have not. My theory is not a system; but the result of what I have seen in the South of Europe, Sicily, the Azores and this Continent: nor do I mean to apply it to the whole world, as I deem that every region has peculiar local features. I take besides whatever is good in every previous theory.

I propose to divide the formations as follow, in 3 series and 10 groups; each with many formations.

1. Series.—Inorganic formations.
   1 gr. Uniform formations.
   2 gr. Compound formations.
   3 gr. Volcanic formations, including the Basaltic and Trapic.