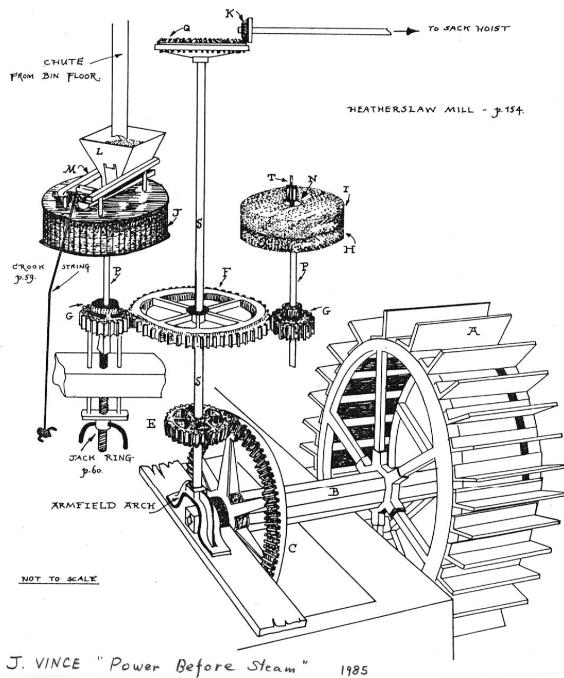


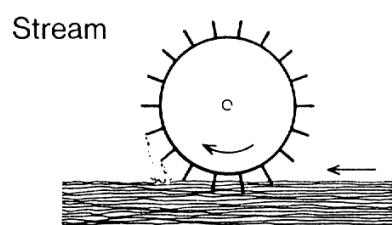
## 1. 水車の特徴

- ・畜力のように生命の維持を必要としてない。
- ・大出力が得られる。
- ・機械を動かす回転運動。
- ・水車動力を伝えるメカニズムの発達。

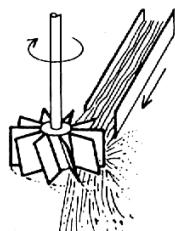


## 2. 水車の形式

## TYPES OF WATERWHEEL



Horizontal  
or  
Norse mill



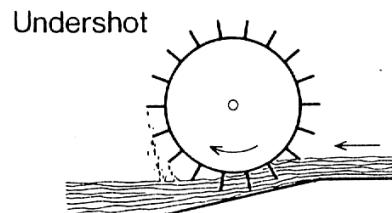
在来型水車の形式

水平型

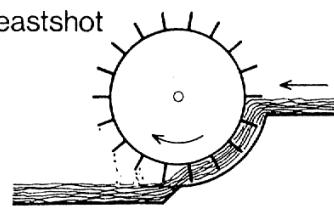
縦型（垂直型）

下掛け

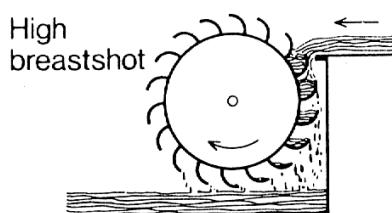
胸掛け



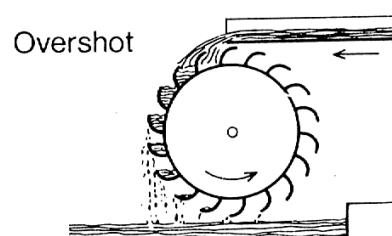
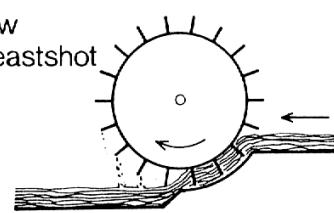
Breastshot



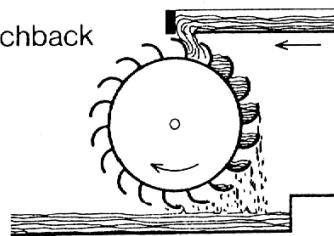
上掛け



Low  
breastshot



Pitchback



NEIL COSSONS "Industrial Archaeology" 1987

### 3. 日本の水車

- ・揚水と米つき
- ・西洋のように大規模な工場動力源にはならなかった。
- ・明治期に近代的洋式水車を導入

#### 水力発電の水車

フルネイロン型

フランシス型

ペルトン型

プロペラ型

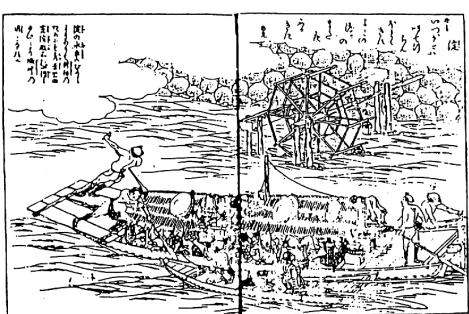


図17 踏車 (1583)

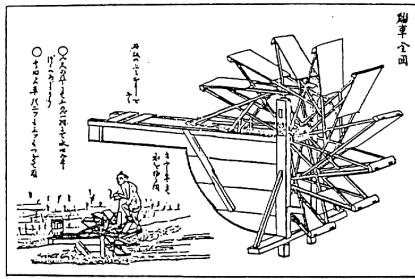


図17 踏車 (1661~1673)

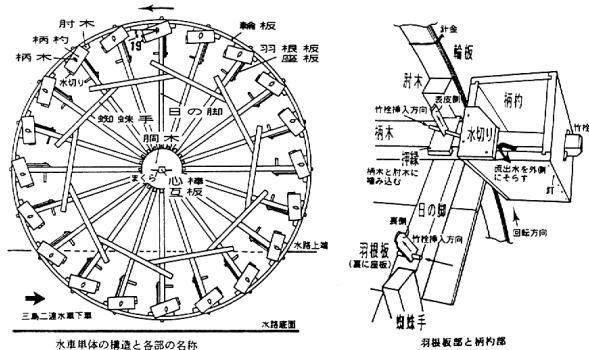


図13 揚水水車単体の構造と各部の名称

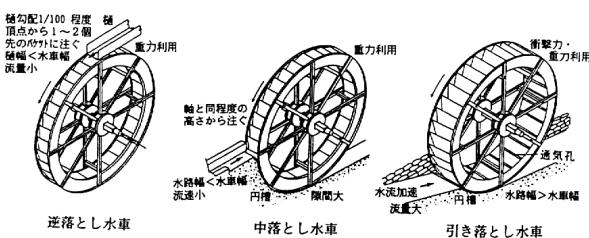


図16 八女地方の動力水車の形式

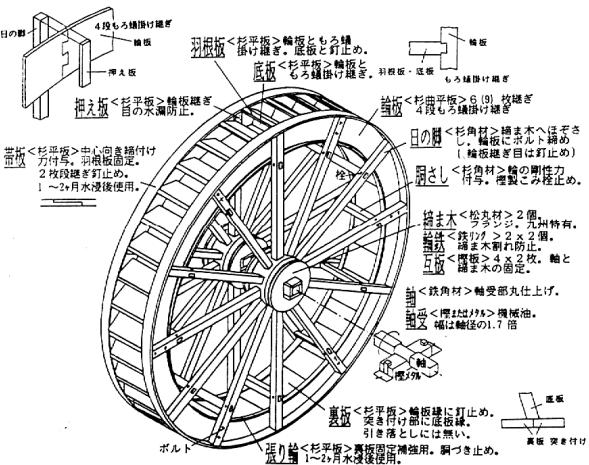


図17 逆落とし水車の構造

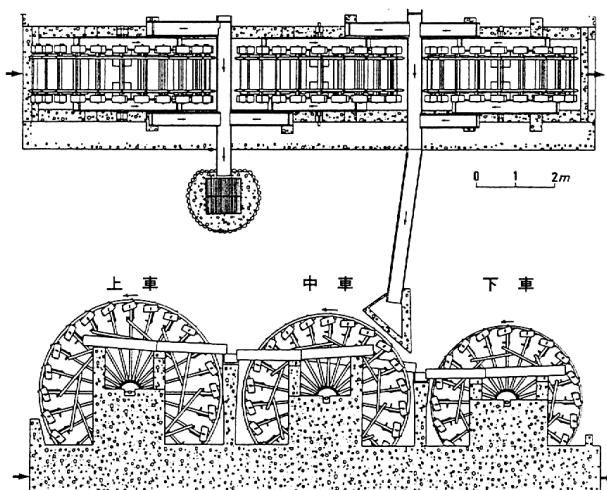


図10 菱野三連水車の構造

## 1. 『デ・レ・メタリカ』にみる中世の鉱山技術と水車の利用

DE LE METALLICA(1533-1550)、全12巻の書

BOOK VI.

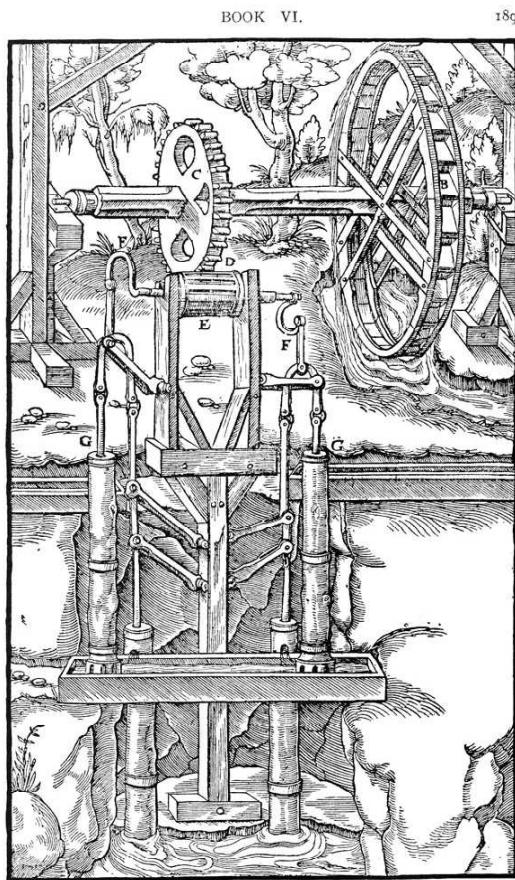
199

訳書名：『金属について』

著者：ゲオルク・アグリコラ (Georg Agricola  
a、本名 ゲオルク・バウアー、Georg Bauer、1  
494年3月24日 - 1555年11月21日)

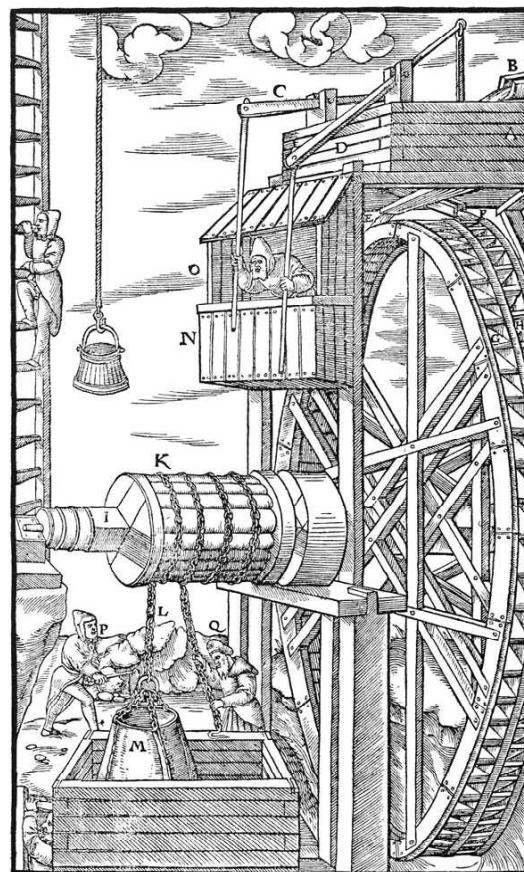
ドイツの鉱山学者、鉱物学者、人文学者、医者。「鉱山学の父」として知られる。

※同時代の技術書



A—UPPER AXLE. B—WHEEL WHOSE BUCKETS THE FORCE OF THE STREAM STRIKES.  
C—TOOTHED DRUM. D—SECOND AXLE. E—DRUM COMPOSED OF RUNDLES. F—CURVED  
ROUND IRONS. G—ROWS OF PUMPS.

図2 水車駆動のポンプによる排水



A—RESERVOIR. B—RACE. C, D—LEVERS. E, F—TROUGHS UNDER THE WATER GATES.  
G, H—DOUBLE ROWS OF BUCKETS. I—AXLE. K—LARGER DRUM. L—DRAWING-CHAIN.  
M—BAG. N—HANGING CAGE. O—MAN WHO DIRECTS THE MACHINE. P, Q—MEN  
EMPTYING BAGS.

図1 水車による巻き上げ機



A—BOX. ALTHOUGH THE UPPER PART IS NOT OPEN, IT IS SHOWN OPEN HERE, THAT THE  
WHEEL MAY BE SEEN. B—WHEEL. C—CAM-SHAFT. D—STAMPS.

図3 水車による鉱石の粉砕



A—BOX LAID FLAT ON THE GROUND. B—ITS BOTTOM WHICH IS MADE OF IRON WIRE. C—BOX INVERTED. D—IRON RODS. E—BOX SUSPENDED FROM A BEAM, THE INSIDE BEING VISIBLE. F—BOX SUSPENDED FROM A BEAM, THE OUTSIDE BEING VISIBLE.

図4 水車による鉱石の粉碎、  
手前に一輪車、  
水車の右手は、篩い機

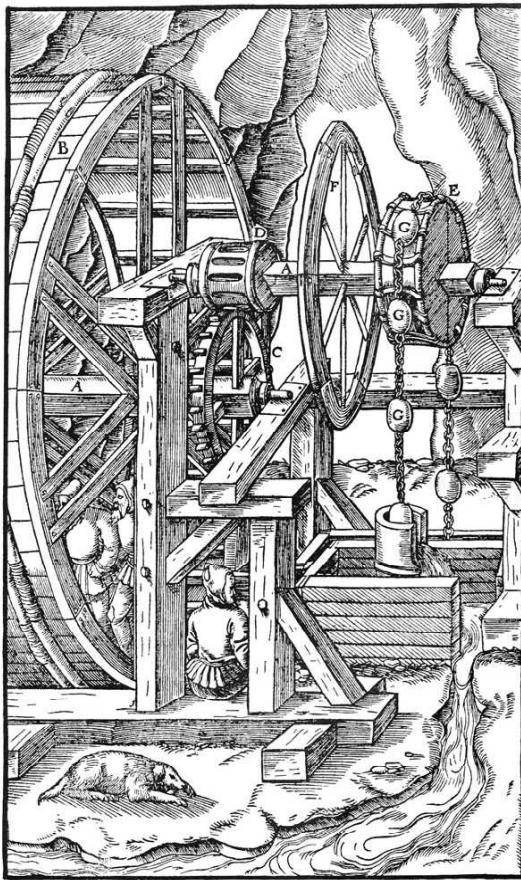


図6 人車による排水機



図5 水車駆動の石臼による鉱石の  
粉碎、  
桶での搅拌、比重選鉱

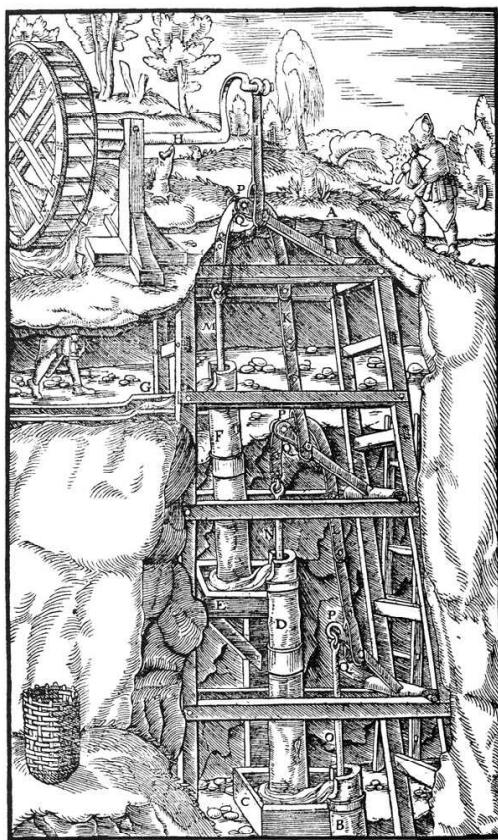


図7 人車による排水機  
Fは、留め具（かすがい）



A—STAMP. B—STEM CUT OUT IN LOWER PART. C—SHOE BARBED AND GROOVED. D—THE OTHER SHOE. E—QUADRANGULAR IRON BAND. F—WEDGE. G—TAPPET. H—ANGULAR CAM-SHAFT. I—CAMS. K—PAIR OF COMPASSES.

図8 水車の機構製作の様子  
車軸・カム、Dはスタンプ（鎚）

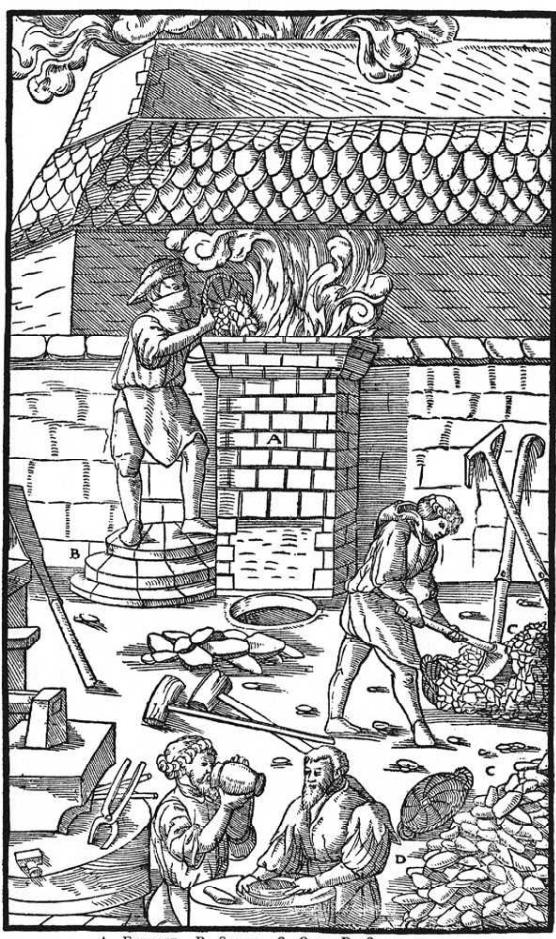


A—SHAFT. B—BOTTOM PUMP. C—FIRST TANK. D—SECOND PUMP. E—SECOND TANK. F—THIRD PUMP. G—THROUGH. H—THE IRON SET IN THE AXLE. I—FIRST PUMP ROD. L—SECOND PUMP ROD. M—THIRD PUMP ROD. N—FIRST PISTON ROD. O—SECOND PISTON ROD. P—LITTLE AXLES. Q—“CLAWS.”

図9 水車による3段ポンプの排水機

BOOK IX.

425



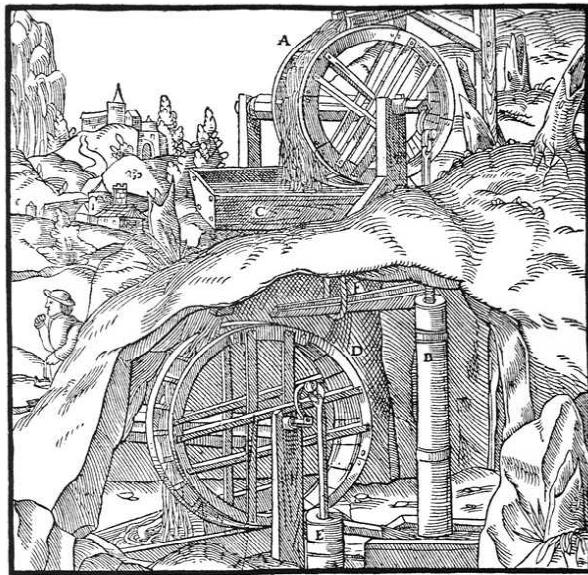
A—FURNACE. B—STAIRS. C—ORE. D—CHARCOAL.

図10 A : 高炉 B : 踏み台 C : 鉱石  
D : 木炭



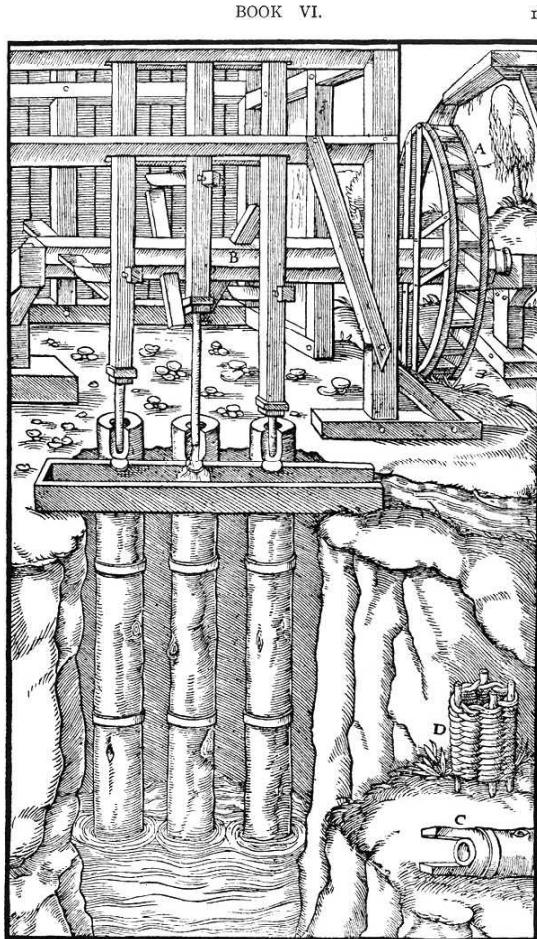
A—FORGE. B—BELLOW. C—TONGS. D—HAMMER. E—COLD STREAM.

図11 A : 火炉（ほど） B : 輛  
C : やっこ D : ハンマー E : 冷水



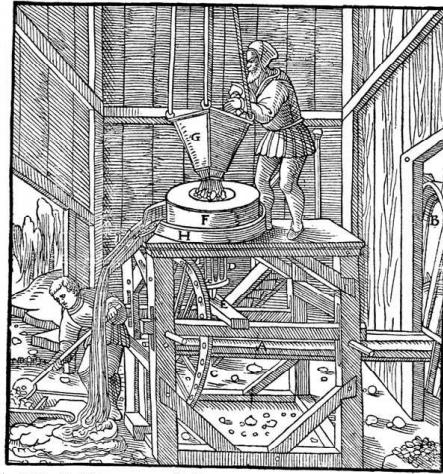
A—WATER WHEEL OF UPPER MACHINE. B—ITS PUMP. C—ITS TROUGH. D—WHEEL OF LOWER MACHINE. E—ITS PUMP. F—RACE.

図12 水車による2段ポンプの排水機



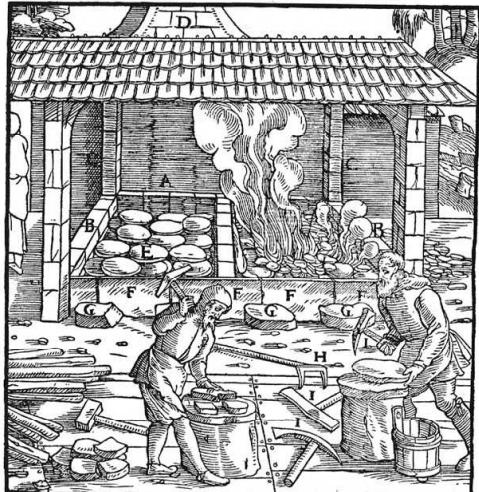
A—WATER-WHEEL. B—AXLE. C—TRUNK ON WHICH THE LOWEST PIPE STANDS. D—BASKET SURROUNDING TRUNK. (Sixth kind of pump—see p. 184.)

図14 水車による3列ポンプの排水機



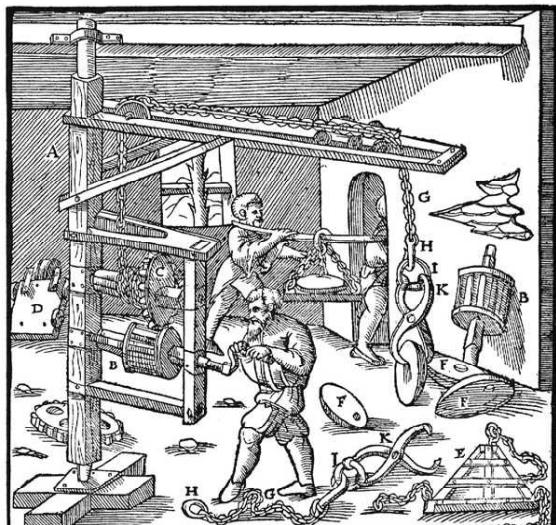
A—AXLE. B—WATER-WHEEL. C—TOOTHED DRUM. D—DRUM MADE OF RUNDLES. E—IRON AXLE. F—MILLSTONE. G—HOPPER. H—ROUND WOODEN PLATE. I—TROUGH.

図13 水車駆動の石臼による鉱石粉碎



A—BACK WALL. B—WALLS AT THE SIDES. C—UPRIGHT POSTS. D—CHIMNEY. E—THE CAKES ARRANGED. F—IRON PLATES. G—ROCKS. H—RABBLE WITH TWO PRONGS. I—HAMMERS.

図14 鍛冶屋



A—CRANE. B—DRUM CONSISTING OF RUNDLES. C—TOOTHED DRUM. D—TROLLEY AND ITS WHEELS. E—TRIANGULAR BOARD. F—CAKES. G—CHAIN OF THE CRANE. H—ITS HOOK. I—RING. K—THE TONGS.

図15 起重機

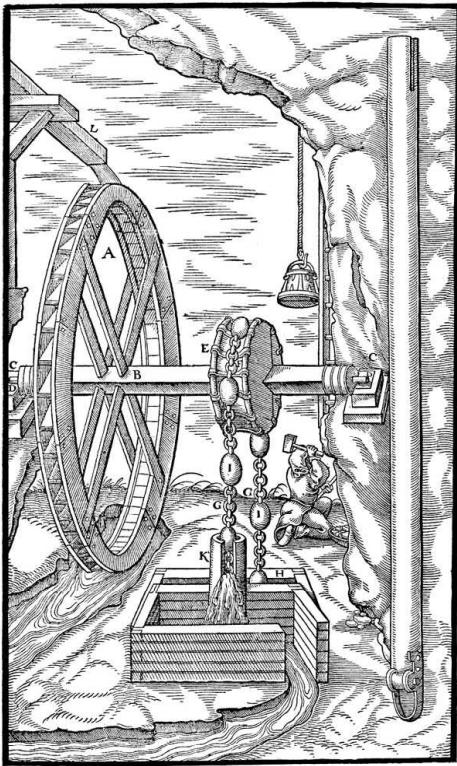


図16 水車によるチェーン式排水機



図17 水車4基による鉱石粉碎機



図18 畜力轍、畜力動輪、足踏み轍



図18 選鉱作業