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## DIRECTIONS

FOR

PLAYING

THE

## GAME OF GENIUS.

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12

## DIRECTIONS

FOR PLAYING

## THE GAME OF GENIUS.

Each player must be provided with a tablet on which he is to mark the number he stands at in the game, which figures are to remain until the game is concluded.

The tetotum is to be marked with pen and ink, 1, 2, 3, 4, 5, 6, 7, 8.

Let each player spin, and sit down in the order indicated by the numbers turned up; the highest to begin.

No player is to read a description twice, but if he arrive at the same number a second time must give the best account he can of the invention from memory, or begin the game again.

If two players arrive at the same number, the last comer must count eight backward from it.

Each player is to add together the number of every successive spin, and move on accordingly: thus, if at the first spin he be at five, and at the next spin turn up 8, he is to mark 13 on his tablet under the 5.

Whoever arrives first at No. 38 wins the game, but whoever exceeds that number must begin again.

No. 1. A MINE. — A mine is an excavation in the earth, where metals or other minerals are found. The most celebrated mines of gold are in Brazil; those of silver, in Mexico; copper, in Sweden and Cornwall; iron, in all parts of Europe; quicksilver, in Hungary and Bohemia; lead, in the northern counties of England and in Flintshire; and tin, in Cornwall. Metals are separated from the stones in which they are found by means of fire. The plate represents an iron-mine at Presburg, in Hungary. Go on to No. 16.



2. TELEGRAPH.—The first modern telegraph was constructed by Dr. Hook, 1684; but it was not till the French revolution that it was applied to any useful purpose. The sort here represented and called a semaphore, was invented in France in 1806, and can make upwards of 300 signals, while the former kind was only capable of making 63. *Spin again.*

3. ORRERY.—An orrery is a machine representing the earth, moon, and planets, by means of globes or balls, which are affixed to wheels, and moved by rack-work. That which is here represented is vertical, and the motions being all out of sight, the bodies revolve behind a screen or transparent medium, so as to present a very pleasing and correct representation of the heavenly bodies. *Go on to No. 8.*

4. GLASS-BLOWING.—Glass is composed of silice, or flint-stone and alkali mixed together: the most common substances being white sand, and soda, or potash. The greenish tinge, observable in common glass, is owing to the presence of iron in the impure alkali of which it was made. Vessels of glass are formed by taking a small quantity of the melted metal, as it is called, upon a long iron tube made red-hot at one end, and blown through by the workmen at the other. The glass expands into a bubble, and being in this state very soft, may be formed into any shape by turning the rod quickly round, and using various tools, as pliers, shears, compasses, &c. To form plate-glass the fluid metal is cast on a copper table, and made smooth by means of a copper roller weighing 500 pounds. After being annealed in an oven it is polished with sand and water, and finished with colcothar or the residuum of aquafortis. Window-glass is first blown into a long cylinder, which while still hot is cut up one side with a pair of shears, and then opened into a flat surface. Bottle-glass is made with sand, lime, and the cheapest alkalies, as wood-ashes, &c. *Go on to No. 9.*

5. GAS-LAMP.—Gas is a term applied to various air-like fluids, and may be extracted from every known substance; but that kind which is commonly employed for affording light, is extracted from coal, and is called

carbureted hydrogen gas; it was discovered by Dr. Clayton, in 1739, and applied to Boulton's foundry in Birmingham, in 1798. In 1805 it was introduced into a cotton-mill at Manchester, and in 1807 the street in front of Carlton House, London, was first illuminated with it by Mr. Winsor. The gas prepared from oil is very superior to that from coal.

6. MAIL-COACH.—Coaches in general are drawn by horses, but in Spain they use mules, in some parts of India oxen, and in Denmark occasionally rein-deer. They were used in France in the 12th century, and in England in the sixteenth. Mail-coaches for the conveyance of letters and passengers at an increased speed, were the invention of John Palmer, Esq. in 1784; but those are now eclipsed in their rate of travelling by many of the light stage-coaches. *Spin twice more.*

7. KALEIDOSCOPE.—The kaleidoscope is an ingenious optical toy invented in Edinburgh, by Dr. Brewster, in 1814. Had the learned inventor taken out a patent for his discovery, he would have realized a vast fortune by it, but having liberally communicated it to the Royal Society of that city, it became known; and it has been calculated that above a million were made and sold within the first year afterwards.

8. TELESCOPE.—Telescopes were first made at Middleburg in Holland, by Zacharias Jansen, in 1590. The invention was the result of an accidental combination of concave and convex glasses. Reflecting telescopes were described by Mr. Gregory of Aberdeen, in 1663, but not executed before Sir I. Newton completed two very small ones in 1672. It was Dr. Hadley who made the first of these on a stand; it was 5 feet long, and magnified equal to one of the ordinary or refracting kind 123 feet long. Reflecting telescopes are used for astronomical purposes.

9. MAGIC-LANTERN.—This pleasing toy is constructed by making a box to hold a lamp, having a chimney at top. The box must have a circular aperture in one side, in which must be fixed a convex lens. Slips of glass being placed between this lens and the lighted lamp,

the figures painted on them are reflected and exhibited greatly magnified on the wall of a darkened room.

10. PAINTING.—The Egyptians seem to have been the first people who practised this art, the earliest specimens being found on the cases of their mummies. The Greeks advanced it gradually towards perfection, but the ancient Romans never executed any thing remarkable in it, and it is curious that landscapes were equally disregarded by all; figures of men and animals being the only branch which engaged their attention. This noble art was revived in Italy, about the year 1400, seventy years after which, Leonardo da Vinci burst like a sun through the surrounding darkness. Michel Angelo was however the painter whose original and grand conceptions, united to a perfect knowledge of the human frame, gave birth to the most exalted compositions. Giulio Romano was a celebrated pupil of Raffaele's, and Titian, Corregio, and the three Caracci, assisted in establishing for Italy an undying renown. After Guido, Domenichino, Poussin, and Salvator Rosa, however, the art began to decline in that country, but arose in Germany, in the persons of Albert Durer and Holbein, while Holland boasted at the same time her Rubens, and Rembrandt. In the reign of Louis XIII., France produced Blanchard, and afterwards Le Sueur, and Le Brun. Murillo was the greatest painter among the Spaniards, but England has many, whose fame is appreciated in every quarter of the globe. Sir Joshua Reynolds, Hogarth, Wilson, West, Romney, Opie, Barry, Fuseli, Smith, Martin, &c., have successively contributed to establish the place which our beloved country is entitled to hold among the foremost ranks of the cultivators of the fine arts. *Spin again.*

11. LITHOGRAPHIC PRINTING was first practised by Alois Senefelder, a German, in 1796. Its principle consists in drawing with a soapy chalk upon stone, on which an acid is afterwards poured, which brings it into such a state that the stone being wetted and then inked with a roller, the drawing alone gives an impression. Hullmandel was the first who brought the art to perfection in this country. The best stones come from

Solenhofen, in Germany. The number of impressions given by a lithographic drawing or writing greatly exceeds that which can be afforded by copper-plates. *Stop one turn to examine the process.*

12. ARCHERY.—The ancients pretended that Apollo, or the Sun, was the inventor of archery, a fiction probably arising from the distance and power with which his rays or beams are darted. According to the Holy Scriptures Ishmael is the first said to have become an archer. The nations of antiquity most celebrated for the use of the bow, were the Persians, Scythians, and Parthians. William the Conqueror brought the practice into England, but his weapons appear to have been the cross-bow. The long bow is first mentioned in the reign of Edward III. after which period this country owed its fame in battle principally to the skill and courage of its archers, who at the distance of 240 yards, could pierce an oaken plank three inches thick. Finsbury fields were appropriated to the practice of this art by the citizens of London so late as 1753, and the Artillery Company was originally a company of archers. A sheaf of arrows was twenty-four.

13. CAMERA-OBSCURA.—This word implies a darkened chamber, and the instrument has a very striking effect. It is thus employed:—a room is to be made quite dark by closing the shutters; in one of these a hole is to be made, above which is a reflector which throws the rays of light downward, through a lens, upon a white medium, on which the spectator sees the perfect images of the objects without, in their natural forms and colours. Ships sailing, or people passing, &c. together with sky, water, houses, and trees, will thus be represented in the most pleasing manner. *Stop one turn to see it.*

14. FIRE-ENGINE.—A fire-engine is a moveable cistern, with a double forcing-pump attached, which is worked by raising and depressing the horizontal arms, by which means the water in the cistern is driven through the leathern tubes, and can be directed to any part of a building on fire. Hand-squirts were formerly used for this purpose, and there is a law still unrepealed, inflicting



a penalty on those who neglect to provide themselves with such instruments.

15. **STEAM-VESELS.**—The first steam-boat was launched at New York, in America, in 1807. Glasgow furnished the earliest that navigated a British river. These vessels are now not only common on all our large rivers, but traverse with confidence the most boisterous seas. America has a ship of war, carrying the largest cannon, which is bomb and shot-proof, and can eject boiling-water upon any assailants, while from its sides hundreds of swords and pikes are thrown out and drawn back four times in each minute. Every season they are becoming more numerous and adventurous, navigating without dismay the Mediterranean, the Baltic, and Adriatic seas, the lake of Geneva, the gulfs of Finland, Bothnia, &c. *Spin again.*

16. **ARTILLERY.**—These terrible engines of war are supposed to have been known to the Chinese 1200 years before they were invented in Europe. Some have been made 20 feet long, and carrying a ball of 100 pounds weight. They were originally formed of iron bars hooped together, and were afterwards cast in brass; but guns of cast iron are now found to answer every purpose, and are much cheaper. They are usually made of a size to carry balls from one to forty-two pounds. *Whoever arrives at this Number must begin the game again.*

17. **AIR-BALLOON.**—Air-balloons are constructed of silk, varnished or gummed, and filled with air lighter than that by which we are surrounded. The first was made by Messrs. Montgolfier, in France, in 1782, and filled with smoke. Lunardi was the first aerial voyager in England, in 1784. They have hitherto availed but little for any useful purpose. Various attempts have for 40 years been made to direct their progress in the air, but until some gas is discovered which will carry up a globe of much smaller dimensions than has hitherto been employed, it does not seem likely that this useful purpose will be effected.

18. **PLAYING-CARDS** were first invented in France about 1738, towards the end of the reign of Charles V. The game of Picquet is the oldest known. Chess is of

much higher antiquity and every way preferable, not depending at all on chance; it is undoubtedly of Asiatic origin, but whether invented in Ceylon 4300 years ago, or in China only 172 years before the Christian era, has not been determined.

19. **WATCH-MAKING.**—A watch may be considered as a portable clock, having a spring substituted for the weights, and a balance-wheel for the pendulum. Clocks of the present kind were first made in 1641, and watches about 1670, both inventions claim a prior date in a much ruder form.

20. **SUNDAY-SCHOOL.**—This valuable and important improvement in education was first established by Mr. Robert Raikes of Gloucester, in 1782, in connexion with the established church of this country. In 1785, the Sunday-school Society was established for all denominations, patronized by several episcopal dignitaries. The first Sunday-school Union was founded in Surrey Chapel, London, in 1803. The practice recently introduced of connecting day-schools upon the British system with Sunday-schools, and thus permitting the teachers to communicate on the Sabbath-day solely religious instruction, bids fair to realize all the objects of the benevolent founder. *Spin again.*

21. **PIN-MAKING.**—The art of making pins with brass-wire was not known in England before the beginning of the 16th century, before which time they were made of wood or ivory. The operations are principally conducted by children; the points are formed on grind-stones, and the heads by a kind of spinning-wheel, which twists a thinner wire into a long spiral, and this being cut at every two or three circumvolutions forms so many heads. Into the centre of each a pin is afterwards thrust, and rivetted by a tap on the top. They are now whitened, by being boiled in a solution of tin, and polished with bran. A child of moderate quickness can point 16,000 pins in each hour.

22. **PAPER-MAKING.**—The first paper is said to have been made in Egypt, and consisted of the skin of a rush, called papyrus, whence it derives its name. The Chinese manufacture it from the greatest variety of sub-

stances, each province having its own kind. In this country the paper used for writing and printing is made from linen rags, which after being carefully assorted, are first washed, then torn to pieces, and afterwards bleached, and farther cut or torn, until reduced to a pulp. This pulp is taken up warm in a mould or box, covered at the top with wire, and the sheets being thus formed, are first pressed between woollen cloths, and then farther pressed without the interposition of the cloths or felts; they are afterwards dried, and then dipped into a tub containing a weak size. *Go on to No. 24.*

23. **MICROSCOPE.**—Microscopes were the invention of Drebell, a Dutchman, in 1621. They are divided into simple and compound; the former are those with which the object itself is seen magnified according to the convexity of the glass through which it is viewed, while the latter presents the spectator with the image of the object still farther magnified by the application of a tube with additional glasses. Solar and oxyhydrogen microscopes throw a reflection of the magnified image on a white wall, in a manner similar to the magic lantern. *Go back to No. 4, and stop there till it is your turn to spin again.*

24. **COPPER-PLATE PRINTING.**—This is performed by first covering the plate with ink, and then polishing it with the hand and whitening; this leaves the ink in the engraved lines, while the surface appears perfectly bright and clean. The plate is then laid on a board, the moistened paper being placed on it, and covered with a thick blanket; the whole is now passed between a roller-press, which pinching very strongly, brings out the ink from the engraved lines on the paper.

25. **COACH-BUILDING.**—The frame-work of a coach is of wood, the timbers of ash, and the panels of mahogany. The lower panels are painted and varnished, and the upper ones covered with leather. There are few trades which employ a greater number of artisans, among whom may be reckoned carpenters, painters, glaziers, carvers and gilders, curriers, lace-makers, woollen-cloth manufacturers, wheelwrights, smiths, buckle-makers, &c. *Go back to No. 6, and stop till your next turn.*

26. **MARINERS' COMPASS.**—This important invention was brought from China by Marco Paulo, in 1620. It is formed by fixing a magnetic needle on the back of a circular piece of card, which has marked on its face the thirty-two points of the compass; this is nicely balanced on an upright pivot, and by its motion round, shows the point of the compass towards which the ship is sailing.

27. **GUNPOWDER.**—Gunpowder is commonly said to be the invention of Schwartz, a German monk in 1360; but others say it is described by our countryman, Friar Bacon, in 1260. It was however certainly known to the Chinese at a much earlier period, perhaps a thousand years before. It is composed of nitre or saltpetre, sulphur, and charcoal, and is capable of discharging a ball 1700 feet in a second. Its destructive powers are however greatly exceeded by steam, which the ingenious Mr. Perkins has made subservient to the purposes of war. *Whoever arrives here loses his chance of the game, and may spend his time in lamenting the waste of human life occasioned by this composition.*

28. **ENGRAVING.**—The earliest style of engraving is that on wood; and of this a familiar specimen as then practised is continually presented in the pictures or court-cards of ordinary playing-cards; it was invented A.D. 1423. The earliest date known, of a copper-plate engraving, is 1461. Etching, or engraving with aquafortis, was first practised about 1504. Mezzotint engraving was invented by Sir Christopher Wren, about 1662. The aquatinta style was first practised in France, by St. Non, in 1662, and afterwards by Le Prince, in 1770. Engraving on steel is more durable than that on copper, and is performed in the same manner. Lithography, or engraving on stone, is a modern invention practised by Senefelder, in 1796; correctly speaking the stone is not engraven, but drawn upon with a soapy chalk to which the printing-ink adheres, while it refuses to combine with any other part of the surface.

29. **GLOBE AND MAP.**—A globe is a spherical representation of the earth or heavens, while a map represents the whole, or any portion of them, on a plane surface.



They are indispensable in acquiring a knowledge of geography or of astronomy. Anaxamander has the honour of their invention 600 years before the Christian era.

30. SHIP-BUILDING.—Ship-building is an art of too great antiquity to make it easy to assign a date for its commencement, unless we consider the ark of Noah the first ship: before the year 1500, however, they were little more than decked boats, never carrying more than 24 guns, and having no port holes. Henry VII. built the first in England with more than one deck, of 80 guns, and 150 tons burden, which was called the Great Harry. Those carrying 50 guns and 400 men and upwards, are called ships of the line: they are divided into first, second, third, and fourth rates;—the first, carry from 100 to 120 guns with 800 men, upon three decks; the second from 80 to 100 guns, with 700 men, upon two decks; the third from 74 to 80 guns, and 650 men; and the fourth from 50 to 60 guns, with 400 men. *Go back to No. 15.*

31. BAROMETER AND THERMOMETER.—The barometer is employed to measure the weight of the air, which being greater in fine weather, causes the mercury in the tube to ascend, while it descends when the atmosphere is lightened, and thus shows accurately the kind of weather that may be expected: it was invented by Torricelli, A. D. 1623. The thermometer signifies literally a measurer of heat, and is constructed upon the principle that some fluids expand or increase in bulk as their temperature is raised. Mercury and alcohol are best adapted for this purpose, and are commonly employed, inclosed in a glass tube, with a scale of degrees at the side.

32. LIFE-BOAT.—A life-boat is a vessel sometimes lined with cork, and so constructed as not to be liable to upset or sink in the heaviest sea. They have been found of the greatest use in cases of shipwreck, and have been the means, since their invention in 1790, of saving thousands of valuable lives. *Spin again.*

33. BATTERING-RAM.—The battering-ram was a long pole having an iron head, shaped like that of a ram, at the extremity. It was worked by soldiers, and driven

violently against the walls of besieged cities, thereby loosening the stones, and enabling the besiegers to enter the place: some of these machines were 200 feet long, weighed 40,000 pounds, and required 1000 men to work them.

34. MUSIC.—The harp or lyre, varying in the number of its strings, from one to seven, appears to have been the most ancient musical instrument; the psalter was similar, but having twelve strings; the violin possesses the same origin, but is played upon with a bow, instead of the fingers. The flute is the most ancient wind instrument; it was sometimes straight, and at others curved. The sackbut was a kind of trumpet. The organ was known to the ancients, and is, in fact, only a number of large flutes, supplied with air by means of bellows, while the stops are opened by the levers called keys. The spinnet, harpsichord, and piano, are several adaptations of the ancient harp or lyre, the strings of which are struck by hammers instead of the fingers. *Stop one turn.*

35. WINDMILL.—Mills were originally invented for the purpose of grinding corn into flour more expeditiously than can be performed by the hand; they were worked by wind or water; the latter invention is the most ancient, and was introduced into this country by the Romans. The power originally obtained from the action of wind or water on the wheels, has been since supplied by horses or steam, and the uses of the machinery extended to a great variety of other purposes; hence we have sugar-mills, oil-mills, mustard-mills, paper-mills, &c.

36. LETTER-PRESS PRINTING.—The printing of letters was originally performed by means of wooden blocks, on each of which a page was engraven in relief; this method is still practised by the Chinese, who in this art, as well as in every other, have obstinately opposed all improvement. Laurence Coster, who resided at Haarlem in 1440, was the first printer of whom we have any knowledge.—Guttenberg invented carved metal types, and employed them, in 1450, in printing the Bible. The next improvement was that of casting the types in moulds, which is the method now employed. William Caxton is considered the father of printing in England. Before

1465 the old Gothic, German, or black letter, was always employed; the present Roman type was introduced by Jensen in Italy, in 1467; the Italic character was invented by Aldus about 1490. The art of printing from types has of late received great improvement by the adoption of iron presses, whereby great advantages in the saving of labour and time are secured. The printing which is performed by steam, is not done by a vertical press, but by cylinders, between which the types and wetted paper are made to pass. The mode of inking the type, formerly effected by dabbing with large balls, is much better executed by means of a cylindrical roller, which diffuses the ink more equally. But the greatest of all improvements is that of Mr. Napier, whose cylindrical presses, worked by one or two men with a fly-wheel, print both sides of the sheet at once, and are capable of producing from three to five thousand impressions per hour. *Stop two turns.*

No. 37. The subject here introduced comprises some of the most striking inventions of modern genius. At a distance is seen a manufactory worked by steam; on the river a steam-vessel pursues its rapid course, while the stream is crossed by a suspension, or chain-bridge, along which is passing a train of those wonderful locomotive engines, which on a railway have conveyed the most enormous burdens at the almost incredible speed of thirty miles per hour.

No. 38. GAME.