AN

ACCOUNT

OF

Mr. JAMES DEEKER's

TWO AERIAL EXPEDITIONS

FROM THE

CITY OF NORWICH.

The first on WEDNESDAY, JUNE 1, 1785; the second on WEDNESDAY, JUNE 22, 1785.

NORWICH:
PRINTED BY JOHN CROUSE.
MDCCLXXXV.

ADVERTISEMENT.

THE following narratives were haſtily drawn up as articles of intelligence for a news-paper, and as ſuch appeared in the Norfolk Chronicle and Norwich Mercury.

They are reprinted at Mr. Deeker's ſuggeſtion, who wiſhes that the circumſtances which attended his firſt attempt at aerial navigation ſhould be made public beyond the circle of the Norwich papers, and more particularly in thoſe places in which he may be

encouraged to undertake ſimilar experiments.

The writer of them would, probably, have conſented to this, merely from a deſire of obliging Mr. Deeker, as the general propriety of his conduct whilſt at Norwich, the great ingenuity and induſtry which he diſcovered in the buſineſs in which he was immediately concerned, and the gratification which he afforded to many thouſand perſons in this neighbourhood, certainly entitle him to ſuch a civility.

Independent,

Independent, however, of this circumſtance, there is, perhaps, a propriety in doing it, if conſidered that, as far as it goes, it will add to the public ſtock of facts reſpecting aeroſtation.

Should aerial navigation ever be reduced to a ſyſtem, it is obvious that it muſt be founded on the united experience of a great variety of trials, and with this view, every, even the moſt trifling experiment, has its value. At the ſame time, though the fertile imaginations of ſo many perſons are buſily employed

ployed in ſuggeſting new modes of conſtructing and managing theſe wonderful machines, and though, probably, ſome of them may lead to real improvements, yet it cannot be doubted but the ſcience is moſt indebted to thoſe who venture to aſcend in the preſent early and imperfect ſtate of it, and that a ſingle fact well authenticated and eſtabliſhed by actual experiment in the upper regions, outweighs a multitude of the moſt ingenious untried ſchemes.

It is, indeed, to be wiſhed, that faithful accounts of the principal

facts

facts attending every experiment of this kind were communicated to the public. They might in time be collected together, and the obſervations derived from ſuch accumulated experience, would greatly forward future attempts at improvement; and ſhould the diſcovery ever be applied to any uſeful purpoſe, ſuch a collection of facts would be of the utmoſt value.

Excepting the trifling obſervations which are added at the end of the narratives, they are printed preciſely as they firſt appeared in the news-papers: it was judged

proper

proper to do ſo, that though, in being reprinted, they have aſſumed ſomething like the form of a pamphlet, they may yet not be conſidered as the ſubject of literary criticiſm.

NORWICH,
July 8, 1785.

E. R.

AN

AN

ACCOUNT, &c.

FIRST ASCENSION.

ON Wedneſday June 1, at ten minutes before four o'clock in the afternoon, Mr. JAMES DEEKER aſcended in his Royal Balloon from Quantrell's Gardens in Norwich.

Though the day was peculiarly unfavourable for ſuch an experiment, and ſome very unfortunate circumſtances occurred which materially injured the balloon previous to its aſcent, (the lower part of it being very much torn) and which, therefore, unavoidably retarded its

going off almoſt an hour beyond the time appointed, yet it roſe in the moſt beautiful manner, with conſiderable rapidity, and exhibited to the very numerous beholders a ſpectacle in the higheſt degree majeſtic and pleaſing.

The wind being North Weſt, it took its courſe toward the South Eaſt, and in about eight minutes, after having gradually decreaſed in its apparent magnitude, it was loſt to the view of the ſpectators by entering a cloud, juſt before which it ſeemed to bear a little more to the North: as the cloud which ſurrounded it, or at leaſt concealed it from the view of the earth, ſeparated, it once or twice appeared again as a very diminiſhed object, and ſome perſons, who were the beſt ſituated for an extenſive view, ſaw it afterwards gradually deſcend until it was totally loſt from their ſight by its apparent approach to the earth; and different perſons, who obſerved with their watches, agreed in ſaying that it was

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about twenty minutes from the time of its aſcent to its ſeeming to come down again.

Thus far is the account as related by many of the ſpectators: the account which Mr. Deeker gives of his aſcent is as follows:

He roſe with a very eaſy and equable motion, was not ſenſible of any diſagreeable ſhaking of the car, nor felt any thing like being impelled by any power which acted upon the balloon with a varying or interrupted force, but the motion was perfectly ſteady and uniform.

When aſcended but a little way he looked downwards, and was much ſtruck with the appearance of the city of Norwich;—it ſeemed to be a large and level collection of buildings, having a great number of intermediate ſpaces compleatly filled with faces, all which ſeemed remarkably white and turned in a direction towards him. He could clearly diſtinguiſh the brow of Mouſhold-heath, the Caſtle-hill, the tops of churches, many ſcaffolds,

Quantrell's Gardens, the adjoining roads and fields, in like manner covered with faces, and he, for ſome time, heard many acclamations. He wiſhed at this time to hold forth a ſignal of his ſafety, but found he had left his flag behind him, he therefore fortunately recollected the car was lined with coloured ſilk; which he immediately rent off and diſplayed it from the end of the car, perhaps to more advantage than if he had had the flag, as it was much larger and more varied in its colour.

A very little after this he found he was entering a cloud, and was immediately ſurrounded with a thick body of vapor. He did not hear any noiſe in paſſing through it, nor did it ſeem to him to rain, but the balloon was ſoon covered with water, which trickled down its ſides very faſt into the car; this, however, continued a very ſhort time, as he ſoon roſe above the cloud, and at once found himſelf in a very clear element, the whole expanſe being beautifully illuminated by the ſun, whoſe rays

ſeemed

ſeemed unuſually bright. He expreſſed himſelf as experiencing a very agreeable ſenſation when arrived at this ſuperior region, but felt a little pain in both ears, and ſeemed rather too cold. The clouds below him appeared to undulate in a peculiar manner, but ſeemed leſs like vapor than like the grey duſt which riſes from broad roads in the ſummer time.

Being at this time ſenſible of no motion, he could not tell whether he was riſing or falling; and the barometer, which had been graduated for the purpoſe of aſcertaining the different heights he might attain, having been left below in conſequence of a damage it had ſuſtained at the time the balloon was injured, he had no other way of judging whether he aſcended or deſcended, but by throwing out ſome feathers which he fortunately had in his pocket; upon dropping ſome of them, he found he left them much below him, and was therefore ſatisfied that he ſtill aſcended with

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conſiderable rapidity: this made him wiſh to open the valve which was at the top of the balloon, and from which a ſtring paſſed through it, but the lower mouth of the balloon having been haſtily and awkwardly tied immediately before his aſcent, he was unable to tell whether the valve gave way or not.

About this time he heard a noiſe which he conceived to be thunder, but it came from below, and it was ſomewhat different in ſound, reſembling more, he thinks, the noiſe of many large water-mills at work; nearly at the ſame time there alſo came on a ſudden guſt of wind which preſſed very ſtrongly on one ſide of the balloon, and the lower part of it burſt near the place which had been imperfectly ſecured after the former accident: being immediately under the opening, he ſaw the whole concave of the balloon, from which circumſtance the opening appeared enormouſly large, ſeeming, (to uſe his own expreſſion) as if it

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would admit the body of a poſt-chaiſe, he immediately roſe up and ſtood upon the edges of the car, having at the ſame time very ſecure hold of the hoop from which it was ſuſpended, and being in no danger of falling out, as he was compleatly within the hoop and the lines which came from the net; he brought the ſides of the torn part together and tied them with a handkerchief; and this he did with leſs difficulty than he could have expected, as the lower part of the ſilk was become perfectly flaccid, and he had done the ſame thing juſt before his aſcent; when he had done this he reſumed his place in the car, and again threw out ſome feathers; he now found they were left conſiderably above him, from which he knew he was deſcending: and looking downwards at this time, he found the clouds ſeparated below him, and he again ſaw the earth, the view of which was particularly pleaſing to him, as he be-

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fore could not be aſſured that he was not over the ſea.

The earth appeared to him as a very wide extended plain, and ſeemed to be a perfectly level ſurface: The firſt object which he diſtinguiſhed with tolerable accuracy, was a large ſhining ſurface, which he ſoon found to be water; but it was not very near him, being probably one of the broads in the large level of marſhes in the Norwich river, which muſt have been to the North of him. The objects he next ſaw were trees, then hedges and fields of different ſizes and colours, and he now plainly diſcovered ſome men who were looking towards him; he was ſurpriſed to find how ſoon he could hear their voices, though he could not diſtinguiſh any thing articulate.

His deſcent now ſeemed to increaſe too quickly, and the balloon began to turn round; not, as Mr. Deeker thinks, round

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its axis, but, as he well deſcribes it, like a ſhuttlecock, which is falling in a perpendicular direction, forming very ſmall circles. At this time he began to feel the want of ballaſt, as all his bags of ſand had been emptied and thrown out before he was many yards above the ground; for he thought he ſhould be in ſome danger of ſtriking againſt a white houſe which ſeemed very near him. He, however, obſerved ſome ſand which had accidentally dropped in the car in emptying the bags; this he immediately gathered up with his hands and threw overboard. This quantity, though it could be but of little weight, certainly checked its deſcent, and the balloon was driven forwards nearly in a horizontal direction, about a mile farther: It then came very near the ground in a meadow at Sizeland, near Loddon, ten miles from Norwich; in this ſituation it juſt floated above the ſurface of the earth about a hundred yards, and then ſtruck upon the ground with ſome force, which Mr. Deeker

foreſeeing, he ſuſpended himſelf from the hoop, raiſing his feet from the bottom of the car, by which he avoided the ſhock of its firſt touching the earth.

The balloon did not rebound from the ground, and being almoſt completely flaccid, it ſoon became ſtationary. He had juſt before thrown out one of the anchors, and which immediately held firm to the earth, but which, he thinks, was of no ſervice, as the balloon was very ſteady without it. Several perſons at this time followed him, and a boy ſoon came up with him, and held a rope while he quitted the car, and which was about twelve minutes paſt four.

The boy obſerved to him immediately, that all the perſons who ſaw the balloon deſcend, concluded he muſt have been deſtroyed, as there had juſt been a very ſevere tempeſt, with much thunder and lightning. This was probably the noiſe which Mr. Deeker heard when above the clouds, and

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it may perhaps alſo account for the guſt of wind which occaſioned the balloon to burſt ſoon after.

It was intended that Miſs Weller, a young lady about fourteen years of age, ſhould have accompanied Mr. Deeker in his aerial expedition; and, as when the balloon was firſt filled, it raiſed 458lbs. excluſive of the weight of the car, it is evident that ſhe might have aſcended with him with perfect ſecurity. She had, indeed, entered the car about half paſt two o'clock, and the whole apparatus would have been ready for their aſcent in about a quarter of an hour; but at this time there being the appearance of an approaching thunder ſtorm, it was judged too hazardous to go off until it was over; nor, indeed, had the time yet arrived at which Mr. Deeker had engaged to aſcend.

In a very little while the ſtorm, which ſeemed to come up very faſt with the wind, was preceded by ſome ſudden and moſt

powerful guſts; theſe acting with extraordinary violence againſt the balloon, it was daſhed about with great impetuoſity, and moſt unfortunately gave way at the lower part of it, near the inferior opening. This happened whilſt Mr. Deeker and the young lady were in the car, which was, however, kept from riſing by the aſſiſtants who ſurrounded it.

A very large quantity of inflammable air eſcaped through this opening, which tainted the atmoſphere to a very conſiderable extent in the direction of the wind. Means were, however, uſed to bring the ſides of the opening together, and the whole was tied with a ſtrong cord; but the ſize of the balloon being diminiſhed by this loſs of air, it became neceſſary to ſhorten the cords to which the hoop and car were affixed.

During this the ſtorm came forwards with increaſed violence; the thunder was very loud, many bright flaſhes of lightning were ſeen, it rained and hailed exceſſively,

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and the air becoming again moſt violently agitated, the balloon was toſſed about as before, and a ſecond rent was made in it near the former; the ſame means were again uſed, and the torn part of the ſilk was once more tied with a handkerchief; but it was found that its power of aſcenſion was greatly diminiſhed, as it raiſed at this time near 300lb. leſs than before.

Miſs Weller, however, with a moſt aſtoniſhing intrepidity, entered the car again, and ſeemed determined to go; but this was found upon trial to be impracticable, as they were raiſed but a few yards above the ground, though all the ballaſt was removed, and even when Mr. Deeker was alone in it, it would not admit of his taking any up with him.

Few perſons have as yet made ſuch an experiment under circumſtances ſo particularly unfortunate and diſcouraging as the preſent; and yet, perhaps, few perſons have at any time ſhewn a more ſteady and rational

tional courage than Mr. Deeker did on this occaſion; his determined reſolution to gratify the curioſity of a croud of ſpectators, perhaps, more numerous, than were ever before aſſembled in this city, made him willingly and even chearfully undertake what many would have conſidered as too dangerous an enterprize; and conſidering the accident which had happened to the balloon, the proſpect there was of more tempeſtuous weather, and the ſmall diſtance he was from the ſea (the wind blowing immediately towards it) there are few perſons, perhaps, but would have thought themſelves fully juſtified in relinquiſhing the attempt.

His conduct indeed in the whole buſineſs has been deſerving of peculiar praiſe; he diſcovered remarkable ſkill in the conſtruction of the balloon and the apparatus; the proceſs for filling it was ſingularly well contrived, and very happily executed, it being completely filled in an hour and a half, though its diameter was very near

thirty

thirty feet; and no one can ſurely deny him the tribute of praiſe for his extraordinary intrepidity in aſcending under theſe diſadvantages, and for his great preſence of mind when aſcended, which was very ſoon apparent in the circumſtance of his tearing away the ſilk from the car to exhibit as a flag, and in his tying up the lacerated part of the balloon, when he was in ſuch an elevated ſituation.

The young lady lamented in the ſtrongeſt terms her not being able to go up with him, and was with great reluctance dragged from the car. She merits indeed the higheſt commendation for her ſurpriſing reſolution, as ſhe exhibited, in the opinion of every one preſent, an unexampled inſtance of ſpirit and fortitude in a female, and more eſpecially in ſo young a lady.

That this account, which is intended to do juſtice to an ingenious and enterpriſing man, and to ſatisfy the expectations of the public, who have expreſſed themſelves very

impatient

impatient to hear an exact relation of this experiment, may not want authenticity, it has been judged proper that the writer of it, who had an opportunity of seeing every part of the apparatus, who attended during the whole process of filling the balloon, who was present when the injury was received by it, by which its ascensional power was so much diminished, who saw Mr. Deeker ascend, and who also received from his own lips the particulars of the foregoing account of it, should subscribe his name to it.

NORWICH,
June 2, 1785.

EDWARD RIGBY.

SECOND ASCENSION.

ON Wedneſday, June 23d, at five minutes paſt three o'clock in the afternoon, Mr. James Deeker aſcended, for the ſecond time, in his Balloon from Quantrell's Gardens, in Norwich.

It was again intended that Miſs Weller ſhould have accompanied him; and ſhe had again the mortification of being placed in the car, and taken out after ſeveral unſucceſsful attempts to elevate it.

The wind being rather high during the time of filling it, the balloon was driven about a good deal, and the lower part of it, at times, very much compreſſed by it; there was, therefore, ſome apprehenſion that the ſame accident which produced ſo much miſchief on the former occaſion, might again occur, which it was ſuggeſted would be the leſs likely to take place if it were not ſo fully inflated as in the former experiment.

Mr. Deeker was induced to consent to this from the well-meant advice of others; though it must be observed, in justice to him, that he much wished to have more air thrown in.

The time which was necessarily taken up in endeavouring to raise the car whilst they were both in it, the taking out the ballast, and indeed every thing else which was in it, except their personal dresses, the disappointment of finding at last that it would not take up the young lady; the further loss of time suffered in putting in fresh ballast and some implements when Miss Weller had left the car, and the apprehension that the large and very respectable company who filled the garden, and who had hitherto with great caution and perfect good-humour avoided doing any thing to interrupt the process, should grow impatient, produced, perhaps unavoidably, a hurry and confusion in the further progress of the business, which in the former part of it had been carefully guarded against:

and

and during this it was found, that, by inadvertently pulling down the balloon at the lower end of it, in order to leſſen the influence of the wind upon it, which ſtill acted with conſiderable force againſt it, the ſtring which communicated with the valve at the top, and which paſſed through the tube at the lower end, was likewiſe drawn downwards with it, the valve was therefore unfortunately opened ſeveral times, and, as it was five inches in diameter, a conſiderable quantity of the inflammable air was loſt.

It was found, however, that it would ſtill raiſe Mr. Deeker with about forty pounds of ballaſt and ſome implements, which were at this time rather haſtily placed in the car.

It was intended, as being conſidered more ſecure and comfortable for Mr. Deeker, that he ſhould go up with a very moderate aſcenſional power, as he would by this

means have more ballaſt with him, have the balloon more perfectly at his command, riſe more gently, and be leſs liable to the diſagreeable circumſtances which occurred in his former voyage; and when he was raiſed from the ground for the laſt time, it was eſtimated that this was equal to between five and ten pounds, and which, probably, would have enabled him to have aſcended without interruption; but unluckily, whilſt he was riſing from the ground, a ſpeaking-trumpet and two pidgeons, which he was very deſirous of taking with him, were thrown into the car without a proportionate quantity of ballaſt being removed; this was, perhaps, the ſole reaſon which made it ſtrike againſt the trees in the garden, and lower on the other ſide of them; for upon throwing out ſome ballaſt he roſe again and paſſed over the brick-ground near the Red Houſe, and throwing out more at that time the balloon roſe again moſt beautifully.

Thoſe

Thoſe ſpectators who were ſo ſituated as to have the full command of the neighbouring proſpect, expreſs themſelves as particularly delighted with the gentle, gradual, and majeſtic manner in which it aſcended, and agree that, as a ſpectacle, it was much more pleaſing than when it went up rapidly and more perpendicularly, as on the former occaſion; and this may eaſily be ſuppoſed, when it is remembered that it muſt, at this time, have continued longer and more diſtinctly an object of their ſight; and that its gradual progreſs and aſcent muſt have been more accurately obſerved by its being compared with the various objects it paſſed over ſo much more ſlowly, and at ſo much leſs a diſtance than before.

At the ſame time it muſt be acknowledged and lamented that the company in the garden had a very imperfect view of it at its firſt going up, the trees which ſurrounded the garden very ſoon excluding it

from

from their view, and preventing their further ſeeing it until it was conſiderably elevated. This circumſtance Mr. Deeker laments moſt ſincerely, as the perſons in the garden were, unqueſtionably, thoſe to whom he was under the greateſt obligation, and were, conſequently thoſe whom he moſt wiſhed to gratify with the ſpectacle.

Excepting the wind, which, as before noticed, was rather too high, (but which was inconvenient only during the proceſs of filling the balloon,) the day was certainly very favourable for the experiment. The wind had been North the whole morning, varying occaſionally a point to the Eaſt or the Weſt, and the direction the balloon took was over Lakenham, Ameringland, Stoke, &c.; for about ſix minutes it gradually moved forwards and very obliquely, ſeeming, in the moſt gentle manner, to glide over the fields, trees, and houſes underneath, and being, during this time, moſt diſtinctly ſeen by the crouds who filled

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all the neighbouring eminences, and who ſeveral times heard Mr. Deeker ſpeak with the trumpet: when he had paſſed over Lakenham, he roſe more rapidly and in a leſs oblique direction, and in a few minutes he entered the clouds; he remained ſeveral minutes concealed from the view of the beholders, and then appeared again to deſcend from the clouds, and to lower more and more until he ſeemed to be near Stoke, or the South ſide of Poringland Heath; from whence he roſe once more with greater celerity than before, and again was loſt in the clouds; he was longer hidden from the ſight at this ſecond time of entering the clouds than before, but was again ſeen to drop gently, and by degrees was totally loſt from the view, apparently deſcending in the neighbourhood of Bungay.

Several perſons who ſaw the balloon from different ſituations agree in this general account of its appearance, as alſo in the

time

time during which they ſaw it, being about twenty-five minutes.—Mr. Deeker's account of the aſcent is as follows:

By his watch it was exactly five minutes paſt three o'clock when he left the garden: Finding that the balloon roſe with difficulty, he threw out ſome ballaſt immediately after paſſing the trees, and this enabled him to get over the Red Houſe, ſoon after which he threw out more ballaſt, and roſe more quickly over the adjoining brick ground.

The motion was, as before, perfectly ſmooth, and as he knew he had ſufficient ballaſt, he was entirely at his eaſe. Being for ſeveral minutes at a much leſs diſtance from the earth than when he aſcended before, he could more diſtinctly ſee the various objects which he paſſed over, and hear the acclamations of the people below him, and who, he obſerves, were even more numerous than on the former occaſion. The general landſcape was a more pleaſing object of his ſight than before, as the different

parts

parts which compoſed it were more accurately marked; and as he could diſtinguiſh prominences, it had leſs the appearance of a flat and level plain. He repeatedly ſpoke with the trumpet as he paſſed along, ſaying he was ſafe and well, and calling by name to ſeveral gentlemen whom he thought likely to be among the crowd. As he moved forwards he ſtill gradually diſcharged ſome ballaſt; and when over Lakenham he threw out a large quantity at once, and immediately riſing higher, and taking leave of the objects near Norwich, he at this time turned his attention to the inſtruments he had with him. The quickſilver in the barometer, which was a curved one, made by Nairne and Blunt, and moſt ingeniouſly contrived for this occaſion, roſe up and down ſo ſuddenly and inceſſantly, that he could not take the exact degree at which it ſtood in either end of the tube. The mercury in the thermometer ſtood, likewiſe, at this time, at the ſame line as on earth, but as he roſe higher it began to

drop, though ſtill very ſlowly: and even when in the clouds it was not more than eight degrees lower than when he began his aſcent, and this took place in the ſpace of nine minutes.

As he continued to riſe quickly he ſoon entered the clouds, juſt before which he let go one of the pidgeons, which immediately flew downwards and towards Norwich, and he ſoon loſt ſight of it. The clouds appeared, as before, like a fog, which was evidently moiſt, but it did not wet the balloon ſo much as before: he thinks, however, they were thicker (that is, occupied more ſpace) than when he laſt went up, for though he was much longer in them than in his firſt aſcent, he did not penetrate through them, and conſequently did not arrive at the ſerener region of clear ſunſhine above them. The clouds too, he ſays, appeared of a different texture, and ſeemed to lie over one another in more regular ſtrata; they were likewiſe not ſo opaque as he before found them, but ſtill ſo much

much ſo as to exclude the view of the earth from him.

As he deſcended from the clouds he found a different landſcape below him, it being much more woody on one ſide, and on the other he obſerved open and uncultivated ground (which proved to be Poringland Heath). He ſuffered himſelf to deſcend further here (for he knew he had ſtill the power of riſing again by throwing out ballaſt), as he ſoon diſtinguiſhed ſome perſons below who were looking towards him; and when he thought himſelf near enough to be heard, he ſpoke to them with the trumpet, and aſked them where he was? They anſwered, at Stoke, at leaſt he underſtood them ſo; this was at 25 minutes paſt three o'clock. He threw out ſome cakes to them which he had with him, and for a little while floated over their heads, after which he ſuddenly threw out ſome more ballaſt, and mounted much more ſwiftly than before; as he was this time much ſooner in the clouds. As he

aſcended from Stoke he let go the other pidgeon, which likewiſe flew towards Norwich. He remained much longer in the clouds at this time than before, and here he recollected that he had an atmoſpherical electrometer in his pocket, which he immediately took out and expoſed; but though it was a very nice and ſenſible inſtrument, it remained unaffected; and to prove that the inſtrument was not injured, or inſenſible to the electric fluid in that elevated ſituation, he excited it by rubbing a piece of cork which was faſtened to the end of a glaſs tube for that purpoſe, and when brought near the inſtrument the balls immediately ſeparated from each other as when the ſame experiment is made on earth; the manner of doing which had been previouſly ſhewn to Mr. Deeker.

As he deſcended from the clouds for the ſecond time, he immediately ſaw the ſea at the extremity of the view beneath him, and to obſerve it more diſtinctly, he looked at it through a teleſcope, by which means

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he ſaw it ſtill more clearly; it appeared to be much nearer him than it afterwards proved to be, and from this circumſtance he did not uſe any means to prevent his deſcending at this time, though he did not think it neceſſary to haſten his deſcent by opening the valve, or otherwiſe diſcharging any air from the balloon.

His deſcent was not very quick, as he found by the feathers which he threw out at this time, which he had likewiſe done ſeveral times before in the courſe of his voyage, and which he always found to anſwer the purpoſe of aſcertaining whether he was riſing or ſinking.

When he approached nearer the earth he did not obſerve the car to turn round, though a gentleman who was underneath at the time afterwards told him that he obſerved it to do ſo once at leaſt. When the car firſt touched the earth, though it only grazed againſt it for ſome yards, yet it was attended with a conſiderable ſhock, the injury from which to himſelf he eaſily

avoided

avoided by ſuſpending himſelf from the hoop as in his former deſcent; but the barometer and two thermometers were much injured by it. Mr. Deeker threw ſomething more from the car in this field, as there were no perſons preſent to aſſiſt in holding the balloon down, and it roſe up rather ſuddenly and ſtruck againſt two trees with conſiderable violence, but without injuring him or the balloon, and as it was ſoon diſengaged from them it came to the ground in the next field, which was ploughed land. There were ſeveral perſons in this who at once took hold of the ropes, and Mr. Deeker inſtantly opening the valve, ſuch a quantity of air was immediately loſt as ſoon made it ſtationary. He was now informed that he was at Topcroft, about twelve miles from Norwich, and in a field belonging to Mr. Bond of that place; the time, by his watch, being ten minutes before four, ſo that the voyage was performed exactly in three quarters of an hour.

Several gentlemen who had purſued the balloon

balloon on horſeback from its firſt going from Norwich, came up with it within a quarter of an hour after its deſcent, and were of much uſe in aſſiſting him at that time.

Mr. Deeker ſoon after received a polite invitation to dine with William Smyth, Eſq; of Topcroft, which he was happy to accept, as he ſtood in need of ſome refreſhment. He expreſſes himſelf as particularly honoured by this Gentleman's notice, and as much gratified by the *hoſpitable* and very liberal manner in which Mr. Smyth entertained him and the friends who followed him; among whom were Mr. Weller, Mrs. Deeker, and Miſs Weller, the latter of whom would have been much happier to have arrived there in the balloon with Mr. Deeker.

As Mr. Deeker found it impracticable, during the whole courſe of the voyage, to take an accurate account of the height at which the mercury ſtood in the barometer, from its being in a continual ſtate of irregular

gular fluctuation in the tube, as before obſerved, it is impoſſible to aſcertain the height to which he aſcended; but admitting that he went no higher than the clouds, it may eaſily be ſuppoſed that their elevation was by no means inconſiderable, when it is obſerved that the air was very denſe at the time, the barometer upon the earth ſtanding at thirty degrees five-tenths.

The circumſtances which occurred in this laſt aſcent being ſo very different to thoſe in the former, there can be no doubt but that, as an Aeronaut, Mr. Deeker will profit much by the joint experience of both.—That he was perfectly ſteady and collected need ſcarcely be obſerved, as there were thouſands who were witneſſes to it, and who were ſufficiently near him to ſee his perſon. He is further entitled to commendation for his great readineſs to undertake ſome troubleſome experiments which were propoſed to him. The unexpected confuſion which took place when the attempt was made to raiſe the balloon with

Miſs

Miſs Weller in it, injured ſome inſtruments which were intended for this purpoſe. It was likewiſe at one time deſigned that he ſhould carry with him an apparatus for boiling water at a certain elevation in the atmoſphere, and that he ſhould have diſcharged two piſtols when at his greateſt heigth. From the unfortunate event of Mr. Roſier's late experiment, it was, however, judged prudent to decline taking up fire, even under circumſtances of the utmoſt ſecurity. Mr. Deeker, notwithſtanding this, was ſo obliging, and it may be added ſo courageous, as ſtill to offer to take them up, if the perſons who propoſed it expreſſed the leaſt wiſh to have it done.

The writer of this can bear the moſt poſitive teſtimony to the truth of the account of what paſſed before the aſcent, and the account of what occurred during and after the voyage he had from Mr. Deeker perſonally.

NORWICH,
June 23, 1785.

EDWARD RIGBY.

THERE have, probably, been very few experiments of this kind, from the circumſtances attending which, either as relating to the machine itſelf, the mode of filling it, its manner of aſcent &c. but ſome obſervations may be derived which may be advantageouſly applied in the management of future ones; and it may, therefore, perhaps, be of ſome uſe to thoſe who are engaged in ſimilar experiments, to notice a few of thoſe which moſt obviouſly ariſe from the conſideration of the preceding ones.

When balloons firſt became the ſubjects of general converſation, no circumſtances were conſidered ſo likely to be miſchievous to adventurers, as their ſudden burſting in an elevated ſituation, or their meeting with thunder ſtorms in paſſing through the higher regions of the atmoſphere.

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The happy termination of Mr. Deeker's firſt experiment, in which both theſe circumſtances occurred, proves at leaſt that there is not ſo much danger from ſuch accidents as has hitherto been imagined.—There can be no doubt, from the ſevere tempeſt of thunder and lightning which had happened juſt before, but the atmoſphere muſt have been charged with the electric matter to a conſiderable extent at the time of his going up, and there is, likewiſe, the utmoſt probability that ſome of the clouds, which he nearly approached, or perhaps paſſed through, in aſcending, were highly loaded with it, as it is pretty certain that an exploſion took place ſoon after he was above them. Had not this ſuppoſition been confirmed when he came to the earth, by the relations of the perſons he firſt ſpoke to, the noiſe which he heard ſoon after he had paſſed through the clouds, and the ſingular guſt of wind which he at that time experienced, muſt have been conſidered as very characteriſtic of ſuch a circum-

ſtance; the latter being, probably, owing to the vacuum, or at leaſt to the very great degree of rarefaction produced in the body of air through which the electric fluid paſſed, and to the ſudden ruſhing in of the ſurrounding and more denſe air, which muſt immediately follow it.

There can be no doubt, alſo, but that a very large quantity of the inflammable air muſt have been loſt, when ſo very large an opening was made into it by the laceration of the lower part of the balloon, and more eſpecially when it is conſidered that the machine muſt have been tilted to one ſide by the very preſſure from the wind which occaſioned the accident; the large quantity which was evidently loſt when the ſame accident happened before its aſcent, and which took place preciſely in the ſame part of the balloon, makes this very certain; and if it be recollected that the ſame quantity becomes relatively much greater when taken from a ſmaller than from a larger maſs of air, it is evident that

the deſcent of the balloon became at this time unavoidable, and was probably very rapid, and yet Mr. Deeker ſeems not only to have experienced no inconvenience whilſt deſcending, but to have been inſenſible of the motion of the balloon until he came near ſome viſible objects on the earth, even the extraordinary whirling motion of the car, which in all probability took place when it firſt began to deſcend, and which is a ſtrong proof of the rapidity of its fall, being unperceived by him until he was near the ground. The moment of danger from ſuch rapid deſcents appears therefore to be only when the car firſt touches the ground; and this Mr. Deeker being aware of, he very judiciouſly guarded againſt by ſuſpending himſelf from the hoop.

The above plain fact proves then, unqueſtionably, that a very large quantity of the light air may ſuddenly eſcape from the balloon, without any inconvenience ariſing other than its immediate deſcent, and there-

fore when it becomes deſireable to deſcend ſuddenly, on account of the too near approach of the ſea, or other large bodies of water, that the voyager may confidently open the valve, or uſe any other method to promote the moſt liberal eſcape of it.

The advantage which Mr. Deeker obviouſly derived from ſuſpending his whole weight from the hoop of the balloon, at the time of the boat firſt touching the earth, (as by it he not only avoided a very diſagreeable ſenſation, but probably eſcaped ſome danger), ſhould certainly induce others in the ſame ſituation to be particularly attentive to this circumſtance; and on this account, perhaps, it might be uſeful to have ſomething like a belt or ſtirrup ſuſpended from the hoop to receive the feet at that time, or, which may be ſtill better, the ſeats might be made to ſwing from the hoop like hammocks, and placed ſo high that the feet of the perſons in them might eaſily avoid touching the bottom of the boat.

Though at the time of Mr. Deeker's leaving the earth in the firſt experiment, it was haſtily imagined that the balloon would not admit of his taking any ballaſt; yet from the rapidity with which it aſcended, and the great elevation above the clouds which it certainly attained, there can be no doubt but he might have taken up ſome, and for want of which he was evidently more at the mercy of the wind, and conſequently more inſecure than he would otherwiſe have been. The importance of having a ſufficient quantity of ballaſt was likewiſe proved in the ſecond experiment; the peculiar eaſe and ſecurity with which that voyage was performed having been entirely owing to this circumſtance. It is, indeed, ſufficiently obvious, that the comfort and ſafety of theſe voyages muſt depend wholly upon the controul which the aeronaut has over the power by which the aſcent and deſcent of the balloon are effected; and as whatever other methods future ingenuity may contrive to diſpoſe the veſſel to riſe or

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fall, to render it ſtationary, or to keep it uniformly in any particular direction, the chief principles on which the machine aſcends or deſcends muſt be its comparative gravity and levity, and as theſe muſt unqueſtionably depend upon the proportionate quantity of inflammable air and ballaſt, the regulation of the whole muſt, therefore, reſt principally upon the power which the voyager has of retaining or of parting with theſe two materials, as circumſtances ſhall require.

It becomes, therefore, of the utmoſt conſequence, that a conſiderable quantity of ballaſt ſhould always be taken up; that this quantity ſhould alſo be accurately aſcertained previous to aſcending, and that the whole weight which the balloon, when filled for the experiment, is capable of raiſing from the ground ſhould be obſerved; from which alone the aſcenſional power with which it riſes can be preciſely known, and which muſt obviouſly be the difference between what the machine would lift

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from the ground, and what it actually takes up in aſcending. It may, further, be not improper in this place to remark that the ballaſt ſhould on no account be too laviſhly or unneceſſarily expended, and for this reaſon, as alſo that what is neceſſary to be removed may more readily be diſcharged, and the quantity more accurately known, it certainly would be more convenient to have the ſand placed in many ſmall bags rather than in a few large ones; were thoſe ſo ſmall as not to hold more than one or two pounds, there would be no occaſion to untie the mouths of the bags, which muſt always produce delay, and ſometimes embarraſſment, ſhould any difficulty ariſe in doing it.

It is probable, however, that ſome more convenient method of diſpoſing the ballaſt will e'er long be adopted. It has been ſuggeſted by an ingenious gentleman in this neighbourhood, that ſand, made ſo dry as to be perfectly fluid, might be included in a pyramidical caſe like a mill hopper, with

a large mouth, through which the ſand could eaſily paſs, and ſtopped with a ſlip, to be acted upon by a lever, ſo as to be opened to any degree with little difficulty, and the ballaſt diſcharged in any proportion, and which might likewiſe be aſcertained by a ſcale placed in the inſide with the ſand. The whole of it might be fixed in the middle of the boat, the lower mouth opening underneath, and the lever might be brought under the flooring of the boat and moved with a tiller. The inconveniences which may ariſe from looſe bags of ſand rolling about the boat upon any ſudden and irregular motion of the balloon would certainly be obviated by this expedient, the ballaſt would be diſcharged more eaſily and gradually, and there would be no ſand ſcattered about the boat as uſually happens in the preſent mode of emptying the bags.

Though, as before remarked, when it becomes neceſſary to deſcend ſuddenly and finally, a very large quantity of the inflam-

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mable air may be ſuffered to eſcape, and though perhaps it may be of no importance at this time to aſcertain the quantity which is loſt, yet when it is the wiſh of the aeronaut to deſcend but a little way, and ſtill to retain the power of reaſcending and purſuing the voyage further, it becomes of conſequence that too large a quantity ſhould not be ſet at liberty, or indeed that any of it ſhould be unneceſſarily expended; it would therefore, under theſe circumſtances, be very uſeful to form ſome conjecture how much air eſcapes in a given time of the valve being open, or at leaſt how much the power of aſcending is diminiſhed by it.—It would perhaps be impoſſible to know this with perfect accuracy, becauſe, in all probability the air will eſcape moſt quickly when the balloon is fulleſt, there being at that time the greateſt preſſure upwards, and there may be even ſome difference in its paſſing out when in the denſe air near the ſurface of the earth, and when in a rarer part of the atmoſphere in the

higher regions, and it is likewiſe obvious, that though the quantity which is let out in two trials may be the ſame, yet its relation to what remains, if that be very different in quantity, muſt alſo be materially different. It would, however, certainly be of ſome uſe to make an experiment to this purpoſe before the balloon aſcends, and this might be done by keeping the valve open at that time one, two or more minutes, and obſerving at the end of that time how much leſs weight the machine will raiſe. If the balloon be well filled this experiment may be made without any inconvenience ariſing from the loſs of air; but if the valve be a large one, it perhaps would be improper to have it open longer than a few ſeconds, and its effect in decreaſing the aſcenſional power ſhould in this caſe be nicely obſerved by a ſtop watch.

Mr. Deeker's two experiments exhibited a remarkable difference in the manner of the balloon's aſcent; the firſt having been liberated rather haſtily, and not being ſufficiently

ficiently ballaſted, roſe with great velocity, and with but little deviation from a perpendicular direction, and the latter being leſs perfectly filled and over-weighted, roſe at firſt with too much reluctance, and moved in too oblique or rather horizontal a direction: there can be no doubt, however, though the former, as a ſpectacle, excited the greateſt ſurprize in thoſe who beheld it, and the latter, from its ſlow motion and horizontal direction, was but imperfectly ſeen by thoſe who were ſo ſituated as to have too limited an horizon (and which unluckily was the caſe with thoſe who were in the garden), that a gradual aſcent muſt on every conſideration be preferable to a rapid one.—With reſpect to the perſon who goes up, it certainly is ſafer, and muſt be moſt agreeable; he muſt be able more diſtinctly to view the various objects on the earth, and to obſerve the different appearances which the ſame objects aſſume at the different elevations of the balloon, and there can be no doubt

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that he muſt be better able in paſſing along to make obſervations with the different inſtruments he may take with him; and even as a ſpectacle to thoſe below, it muſt be more pleaſing, as being a more diſtinct object of their ſight, and remaining longer within the view; and the united teſtimony of thoſe who had an uninterrupted view of the laſt experiment very much favours this remark. The balloon having, the ſecond time of its aſcent, been alſo obſerved by perſons at a greater diſtance, and for a much longer time than in the firſt experiment, is moreover a further proof of this.—It was diſtinctly ſeen from Yarmouth, which is twenty miles from Norwich, about ſeventeen minutes.

It cannot be denied but that the diſappointment of the balloon not being able to carry up two perſons, the injury which was done to the inſtruments in making the attempt, and the diſagreeable confuſion and embarraſſment which followed, were, in the laſt experiment, principally owing

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to an inadvertence of Mr. Deeker and the perſons who ſuperintended the proceſs of filling the machine.—Being convinced from the event of the firſt experiment, that a large quantity of air might with ſafety be ſuddenly let out, Mr. Deeker had made a new valve, much larger and more ſenſible than the former; being reſolved, ſhould he, in the ſecond aſcent, find it neceſſary to deſcend ſuddenly, to diſcharge the air more freely and quickly than the former valve would have admitted of; and he was particularly led to this, on account of the probability there was of his being carried to the ſea coaſt.—Unfortunately the difference between the firſt and ſecond valve was not recollected at the time of filling the balloon, and, as was obſerved in the narrative, it was certainly opened ſeveral times when the balloon was drawn down by pulling at the lower end of it. To guard againſt this inconvenience in future, the ſtring, which is connected with the valve, ſhould be coiled up within the balloon, ſo that there

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may be length enough of it in the inſide to admit of the collar of the balloon, through which it paſſes, being drawn down, without the ſtring being put upon the ſtretch.

It is not, indeed, to be wondered at, in a buſineſs, the nature of which renders it ſo complicated, and in which ſo few perſons can as yet have acquired much experience, that omiſſions and overſights ſhould happen. It proves, however, the neceſſity there is for its being done methodically, and that the whole ſhould be ſo arranged that the different parts may be diſtinctly obſerved and ſeparately executed. A plan of the entire proceſs, ſimplified as much as may be, ſhould be previouſly adopted, and every minute circumſtance, which is neceſſary to be done, and in the proper order of their occurrence, ſhould be written down, to be referred to at the time of filling the balloon. There ſhould, likewiſe, be as few perſons as poſſible engaged in the buſineſs, and each ſhould have

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his ſeparate office allotted to him; as a very few more than are immediately neceſſary muſt incommode the reſt; and for the ſame reaſon it is obvious that at all events the company who are preſent at the exhibition ſhould be kept from the circle in which the proceſs is carried on.

The balloon is twenty nine feet in diameter, the quantity of ſilk of which it is made is five hundred and ſixty yards, and the weight it raiſed when filled for the firſt experiment, was as follows,

	lb.
In weights placed in the car	458
Balloon - - -	85
Car - - -	48
Platform, net-work, ſeats and trimmings, belonging to the car	28½
Hoop - -	8¼
Net which covers the balloon.	39½
	667¼

to which may be added the extra weight

which the net had acquired by being compleatly wet from the rain which continued almoſt the whole time during which the balloon was filling, and which muſt therefore have been conſiderable.

FINIS.